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ABSTRACT

A study examined current age limitation policies affecting Federal public safety personnel and the interrelationship between job performance and aging. The study concluded that mandatory retirement of competent law enforcement officers and firefighters is unnecessary and wasteful and that the Federal Government's failure to recognize this problem should not be compounded by allowing the States and their political subdivisions also to discriminate against their employees based on age. It was recommended that the States and their political subdivisions should, in accordance with the goals of the Age Discrimination in Employment Act, test their public safety officers for fitness rather than make stereotyped assumptions of incapacity due to age. (This report has two appendixes, a chronology of legislation affecting Federal public safety and a report entitled "Health and Performance Appraisal of Workers in Certain Occupations Exempt from the Age Discrimination in Employment Act as Amended in 1978" by Carol C. Hogue.) (MN)

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THE MYTHS AND REALITIES OF AGE LIMITS FOR LAW ENFORCEMENT AND FIREFIGHTING PERSONNEL

A REPORT

BY THE

CHAIRMAN

OF THE

SELECT COMMITTEE ON AGING
HOUSE OF REPRESENTATIVES

NINETY-EIGHTH CONGRESS

SECOND SESSION

U.S. DEPARTMENT OF EDUCATION
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FOREWORD

In recent years, the concept of mandatory retirement based solely on age has become increasingly unacceptable, even repugnant, to the vast majority of Americans. Federal legislation has made mandatory retirement nearly extinct and where federal law does not prohibit it most employers have chosen to eradicate it voluntarily.

Despite great progress toward protection of the fundamental civil rights of middle-aged and older Americans, there is a disturbing resurgence of ageism by some sectors of our society. The most recent is a cry for early mandatory retirement ages and hiring age limits by some state and local governments for their law enforcement and firefighting personnel. This upsurge was stimulated in 1983 by a Supreme Court decision (EEOC v. Wyoming) which made it clear that federal protections do, in fact, apply to states and localities.

Despite the allowance for age-related hiring and retirement policies already allowed by the Age Discrimination in Employment Act (if age can be shown to be a legitimate occupational requirement), proponents of mandatory retirement and hiring age limits for public safety workers have introduced their own legislation to allow State and local governments to set any forced retirement or maximum hiring age they choose.

The principal arguments used to justify early mandatory retirement for public safety workers is that the strenuous nature of the work can only be performed by the "young and vigorous." Mandatory retirement is necessary, so the argument goes, to maintain a physically fit police force or fire department in order to protect the "public safety."

The hollowness of these arguments is best illustrated by the legislation in the 98th Congress (H.R. 5310, S. 2540) introduced to grant States and local governments their freedom to use age as the main

criterion in personnel decisions involving public safety occupations. Ironically, this legislation would not only allow forced retirement at any age for the police officer in a patrol car but also for the police chief who sits at a desk; not only for a firefighter who enters burning buildings but for the dispatcher or desk clerk who never leaves his or her chair for hazardous duty. It would even permit forced retirement for the dietician who works in a penal institution; the same goes for the prison's bus driver and guidance counselor. The list goes on and on.

It is frequently the case that reasonable people will disagree on a given issue. I believe strongly, however, that when presented with the facts it is impossible to justify mandatory retirement or maximum hiring age policies based on arguments of public safety or job-related performance.

This report offers a broad base of information to assist Members of Congress and other interested parties in making informed judgments about age discrimination in law enforcement and firefighting occupations. The material was compiled by staff with the expert assistance of Mr. Kenneth Morse of the EEOC's Office of Legal Counsel.

It is my hope that after reviewing this information you will conclude, as I have, that age discrimination, no matter what its form, is repugnant and must be eliminated from all sectors of our society.

Edward R. Roybal
Chairman

TABLE OF CONTENTS

	Page
FOREWORD	III
TABLE OF CONTENTS	V
EXECUTIVE SUMMARY	IX
INTRODUCTION	XIII
I. AGE LIMITATION FOR FEDERAL PUBLIC SAFETY PERSONNEL	1
The Origin of Early Retirement for Federal Public Safety Employee	1
Criticism of Age Limitations for Federal Public Safety Personnel	2
Public Safety Work is Not Always Hazardous	5
Variation of Age-Based Limitations in Public Safety Employment	6
Federal Public Safety Employment Age Limitations	7
State and Local Public Safety Employment Age Limits	8

States And Their Political Subdivisions Can Have Age Limitations For Public Safety Officers If They Prove Age Is A Bona Fide Occupational Qualification 9

II. PERFORMANCE AND AGING 9

Job Related Abilities Do Not Inevitably Decline With Age 10

Improved Health of Americans Decreases Need for Mandatory Retirement 11

Performance of Older Law Enforcement Officers and Firefighters 12

Alternatives To Mandatory Retirement For Law Enforcement And Firefighting Personnel 13

It Is Possible To Test For The Ability Of An Individual To Perform The Duties Of Law Enforcement Officer Or Firefighter 14

Cost Savings Associated With Physical Fitness Testing and Training Alterations 15

Individual Costs Associated With Mandatory Retirement 16

Economic and Social Costs Resulting from Allowing State and Local Governments To Impose Mandatory Retirement 19

III. **CONTINUED PROTECTION OF LAW ENFORCEMENT OFFICERS AND FIREFIGHTERS WILL NOT IMPAIR THE FUNCTIONING OF STATE AND LOCAL GOVERNMENT** 20

CONCLUSION 24

FOOTNOTES 25

APPENDIX I 31

Chronology of Legislation Affecting Federal Public Safety 31

APPENDIX II

Health and Performance Appraisal of Workers In Certain Occupations Exempt From The Age Discrimination In Employment Act As Amended In 1978 33

EXECUTIVE SUMMARY

The Supreme Court's 1983 decision in Equal Employment Opportunity Commission v. Wyoming has stimulated a debate about the validity of mandatory retirement ages and maximum hiring ages for public safety officers. Four myths are used to justify legislation to exempt state and local police and fire departments from the Age Discrimination in Employment Act (ADEA). Each of these myths is refuted by evidence provided in this report.

Myth

The present exemption for federal public safety officers from the ADEA justifies a similar exemption for state and local personnel.

Reality

—The federal occupations which allow early forced retirement do so based on a 1947 law which offered special early retirement incentives as a reward for enforcement personnel. That law is now obsolete.

—Recent studies of firefighting and police work indicate that much of the work is less strenuous or hazardous than 30 years ago because of shorter hours and improvements in equipment.

—Half of the federal agencies which are covered by the special early retirement program have chosen not to set maximum hiring ages or mandatory retirement ages because such limits are inefficient and exclude qualified personnel from employment.

—A General Accounting Office study has criticized age limitations for federal public safety workers because aging is a poor predictor of physical or mental performance.

Myth

Age limitations are necessary to allow states and localities to maintain a vigorous public safety workforce.

Reality

—The ADEA does not prevent employers from discharging an individual who is unfit or incompetent. Also, age limitations are allowed by the ADEA if age can be shown to be a "bona fide occupational qualification."

—Nearly one-third of all states have no hiring age limits and 22 percent have no mandatory retirement age. Even among states with mandatory retirement ages, the established age ranges from 50 to 70, indicating that there is no consensus on the necessary age limit.

Myth

Since performance abilities automatically decline with age, it is necessary to set age limits to maintain a fit public safety department.

Reality

—An abudance of scientific evidence exists showing that chronological age is a poor indicator of ability to perform a job.

—Research also shows that older workers do not show significant declines in muscle strength and that their performance in many jobs is equal to, or better than, the job performance of younger workers.

—Physiologists have demonstrated that other factors, such as aerobic and muscular fitness and amount of body fat, are more important in predicting poor performance than is age.

--Police and fire departments that have implemented physical fitness programs and individual testing procedures in lieu of age restrictions have noted improved health and performance and fewer disability claims.

—Age contributes to a police officer's or firefighters' knowledge, skill and experience on the job and contributes to improved performance and a lower injury rate.

—Americans are living longer, healthier lives and therefore can have longer, productive work lives.

Myth

Federal protections against age discrimination are a violation of states rights.

Reality

—The ADEA does not interfere with a state or local government's ability to prescribe reasonable qualifications for public safety officers or to discharge those individuals unfit to perform safely and efficiently.

—If a state or local government can establish a hiring or retirement age limit as a legitimate (bona fide) occupational qualification, the age limitation would not violate the ADEA.

—Merely requiring state and local governments to justify any hiring or retirement age limitation does not impair their ability to function.

INTRODUCTION

The Supreme Court's 1983 decision in Equal Employment Opportunity Commission v. Wyoming[1] has led to a renewed debate about age restrictions for state and local law enforcement officers and firefighters. In the Wyoming decision, the Court upheld the Age Discrimination in Employment Act's (ADEA) application to employees of state and local governments. Therefore, unless hiring or mandatory retirement age restrictions can be shown to be a legitimate (bona fide) occupational qualification, state and local jurisdictions will be barred from using such restrictions before age 70.

The Wyoming decision has sparked a small but vociferous outcry from a few states, some of which are facing lawsuits on their mandatory retirement ages. Pressure from these states led to legislation during the 98th Congress in the House of Representatives by Representative Hughes (H.R. 5310) and in the Senate by Senator Bradley (S. 2540) to exempt states and localities from the ADEA. If enacted, this legislation would allow states and localities to set whatever age restrictions they desire for law enforcement and firefighter personnel.

Three major arguments are used by the proponents of this legislation to justify early mandatory retirement ages for public safety occupations. One argument is that Federal public safety workers have a mandatory retirement age, so why should the states and localities be treated differently? As this report shows, the genesis of the federal mandatory retirement ages was arbitrary and has come under increasing criticism from many sources. Mandatory retirement should be eliminated for these federal occupations; thereby applying the same standard to all law enforcement and firefighting personnel.

A second argument used to support an exemption for states and localities is that law enforcement is strenuous work that cannot be performed effectively and safely by "older" persons. Evidence provided in this report questions the strenuous nature of most public safety work, and more importantly questions the

assumption that age automatically disqualifies a person for such work. Also, many law enforcement and fire departments have demonstrated that a program of medical examinations, physical fitness testing and physical fitness training is a more efficient and cost-effective means of ensuring a fit department.

Last, proponents of this legislation have argued that States should be allowed to set their own policies and that the federal government has no business interferring in such matters. This argument has been clearly refuted by the Supreme Court in its Wyoming decision. More importantly, states do retain the right to set age criteria but only if they can show that age is a bona fide occupational qualification.

Perhaps the most compelling argument against maximum hiring age limitations and mandatory retirement ages is that such age-based limitations are in direct conflict with Congressional intent in enacting the ADEA. As Congress has noted, it is the ADEA's premise that "as a matter of basic civil rights people should be treated in employment on the basis of their individual ability to perform a job...."[2] Congress declared that the purpose of the ADEA was "to promote employment of older persons based on their ability rather than age; to prohibit arbitrary age discrimination in employment...."[3] Maximum hiring age limitations and mandatory retirement ages are in direct conflict with Congressional intent because they are founded on a notion of age-based incapacity and do not consider an individual's potential or job performance.

I. AGE LIMITATION FOR FEDERAL PUBLIC SAFETY PERSONNEL

One argument used by proponents of an ADEA exemption for states and localities is that Federal law enforcement officers and firefighters are not covered by the ADEA. Thus, according to the argument, states and localities should be treated no differently than the Federal government. This section addresses that argument.

The Origin of Early Retirement for Federal Public Safety Employees

In 1947, Congress passed a law[4] which allowed early retirement (age 50 after at least 20 years of service) for FBI personnel whom the Attorney General identified as no longer able to perform efficiently. The liberalized benefits were viewed as a reward for the arduous and hazardous work endured by certain FBI agents. Congress considered the cost of these liberalized benefits to be minimal because only 36 agents would be eligible to retire at the time the law was passed and only 64 agents would become eligible during the following 5 years.

Almost immediately after the adoption of the statute providing special early retirement benefits for certain FBI employees, other employee groups began requesting equal benefits. In 1948,[5] Congress extended special retirement benefits to all employees with duties that involved investigating, apprehending, or detaining persons suspected or convicted of committing federal crimes. Congress extended coverage to certain employees in federal correctional facilities[6] in 1956 and to federal air traffic controllers[7] and firefighters in 1972.[8] Coverage also was extended to employees in these occupations who transferred to supervisory or administrative positions.

In 1974,[9] Congress: (1) further liberalized benefits; (2) deleted all reference to employee hazard as a basis for coverage; (3) emphasized in its legislative history that the liberalized benefits will improve the quality of law enforcement and firefighting services by helping maintain a young and vigorous work force; and, (4) established, effective January, 1978 mandatory retirement at age 55 or 20 years of service, whichever comes later (up to age 60). Many occupational groups became eligible and in 1978 about 52,000 employees in various federal agencies and the District of Columbia government were covered. The head of any agency with employees covered by the special early retirement statute also was authorized to set minimum and maximum hiring ages for covered employees, if approved by the Civil Service Commission. (See Appendix I).

Thus, the liberal retirement benefits policy first passed by Congress in 1947 for the benefit of 36 FBI agents subjected to hazardous duty had, by 1978, been expanded to cover 52,000 employees. The assumptions used to justify the hiring age limitations and mandatory retirement ages for federal law enforcement and firefighting personnel are similar to those used to justify age limitations by states and their political subdivisions. These assumptions have been called into question by scientific evidence and by practical experience.

Criticism of Age Limitations for Federal Public Safety Personnel

The age restrictions placed on federal public safety personnel have been widely criticized. In addition, numerous federal agencies which could choose to set age limitations for hiring have decided not to use such limitations.

Dr. Robert Butler, former Director of the National Institute on Aging of the National Institutes of Health, has said that the federal government is ambivalent in its treatment of older workers. He states: "[T]he federal government practices age discrimination directly and retires arbitrarily rather than on an individual basis."[10]

Strong criticism of Federal special early retirement of public safety employees comes from the General Accounting Office's (GAO) 1977 report to Congress entitled "Early Retirement Policy for Federal Law Enforcement and Fire Fighter Personnel Needs Reevaluation."[11] The GAO report includes the following criticisms:

> [M]any covered employees could continue to perform their jobs satisfactorily after age 50 and others could be assigned to less demanding jobs.[12]
>
> Physical abilities normally decline with age, but the rate of decline differs among individuals. Retirement policies that disregard differences in physical abilities and productive capacity are costly and wasteful.[13]
>
> Several agencies, including the FBI, Postal Service, and Forest Service, require annual physical examinations for older employees. In these examinations, the employee must either pass a specific endurance test or, after a physical examination, be medically certified as capable of performing the job. Through these tests, almost all older employees are determined to be physically capable of performing their jobs.[14]

The GAO report points out that many of the occupations covered by the special early retirement provisions do not involve extraordinary vigor.[15] The report concludes that additional compensation for hazardous duty should be reflected in pay, not retirement benefits, and that those physically unable to work should be retired according to acceptable disability practices.

Many federal agencies covered by the special early retirement provisions recognize that mandatory retirement ages are ineffective ways of ensuring a fit workforce. Half of the agencies with covered employees,

that were contacted by the Office of Personnel Management (OPM) in a 1981 study, asserted that a program of periodic medical examinations would provide a more accurate picture of individual performance ability. The Forest Service recommended the use of the "Step" test - an Office of Personnel Management approved measure of physical fitness for firefighters.[16] The Department of the Army recommended the use of a job-related physical performance test.[17] In summing up the comments of four other federal agencies, the OPM report states:

> The Marshall's Service, Bureau of Indian Affairs, Immigration and Naturalization Service, and Secret Service also stated that it is more logical and equitable to use functional age (as determined through periodic medical examination) rather than chronological age to determine fitness for duty. The advantage in using individualized tests of fitness is obvious when one considers the fact, as noted by the Forest Service, that employees in that agency do not generally retire from primary positions, but from administrative positions which are no more strenuous than similar positions in other fields in which performance is unrelated to chronological age.[18]

Most of the federal agencies with the authority to establish maximum hiring ages have declined to do so. Some of the reasons for this refusal were reported to OPM as part of their study:

> The Forest Service stated there was no conclusive link between age and effectiveness, and the adoption of a maximum entry age would be detrimental to their operations since it would limit their recruitment sources.[19]

> Since the Army and Navy recruit mainly retired military personnel in their late

30's and 40's for both firefighting and protective service occupations, establishment of a maximum entry age would cut-off this valuable recruitment source.[20]

The criticisms by GAO and other agencies discussed above are equally applicable to similar age restrictions used by states and their political subdivisions. Maximum hiring age limitations arbitrarily exclude all but the young from a broad range of government jobs and unnecessarily restrict the pool of applicants. Mandatory retirement policies arbitrarily remove experienced employees from their jobs. Many, if not most, of the law enforcement officers and firefighters mandatorily retired are retired from supervisory or administrative positions that are not as strenuous as primary positions. Finally, medical testing is an effective, less discriminating means of determining an individual's fitness.

Public Safety Work is Not Always Hazardous

One of the purposes of the original special retirement provision for FBI agents was to allow for the early retirement of employees who, after being subjected to hazardous working conditions over many years, could not perform adequately. The GAO pointed out in their report that much of the work of public safety personnel is not hazardous and that the special early retirement provisions are provided without regard to the nature of the work of many of the covered employees.

Recent research on law enforcement officers working for states and their political subdivisions similarly reveals that their work is not hazardous.

-- A study by Professors Elizabeth Flynn and Isadore Silver points out that police work is primarily a service occupation in which the officer has only an "occasional dangerous event." In these situations, presence of mind, maturity, good judgment and self-esteem, all qualities that tend to accompany aging were more

important factors in predicting successful outcome than physical strength.[21]

— A recent study of Minneapolis suburban police departments concluded that the basic factors of observation, analyzing information, decision-making, and oral and written communication were most critical to successfully performing the job. Little demand for physical activity, such as running or lifting, was observed.[22]

— Dr. Paul Davis,[23] an exercise physiologist who has worked with the U.S. Fire Administration, has stated that the risks to which firefighters are exposed have been reduced by the development of improved and more advanced equipment, such as self-contained breathing apparatus, modern helmet design and the use of materials less susceptible to flame.

— Firefighting and law enforcement are in many situations less burdensome today than 30 years ago because of shorter hours and improved equipment.

Variation of Age-Based Limitations In Public Safety Employment

If it were true that people could no longer safely perform arduous work beyond a certain age, then one would expect that there would be a consensus on appropriate hiring and retirement age limits. A review of age limitations for public safety employees in the federal government as well as in state and local governments demonstrates a total absence of agreement in this area.

Federal Public Safety Employment Age Limitations

Hiring:

—While the Bureau of Alcohol, Tobacco and Firearms, Customs Service, Drug Enforcement Administration, FBI, Immigration and Naturalization Service, Marshall Service and Secret Service all have maximum entry age limits, the Army, Bureau of Indian Affairs, Fish and Wildlife Service, Forest Service, Department of Heath, Education and Welfare, and Navy had no hiring age limits at the time of the Office of Personnel Management's report.[24]

—The Army, Forest Service and Navy are opposed to hiring age limits since it would limit their recruitment.

—Dr. Paul Davis, an exercise physiologist who has worked for the FBI, U.S. Fire Administration, Marines and Secret Service has stated that testing for fitness is cost-effective and can more adequately assure a physically fit workforce than hiring maximums or mandatory retirement.

Retirement

—Half of the federal agencies covered by the special early retirement provisions have stated that periodic medical examinations to monitor an employee's physical and mental ability to carry out his or her job are better than a mandatory retirement age.[25]

—Prominent cardiologists and exercise physiologists who have worked for the federal government have argued that a program of medical examinations, physical

fitness testing, and physical fitness training are dramatically more effective than mandatory retirement as a means of ensuring a fit workforce.

State and Local Public Safety Employment Age Limits

Hiring:

—Approximately a third of all states have no maximum entry age for sworn police personnel.[26]

—The entry age range for those states with hiring age maximums is from 28 to 45.[27]

—A substantial number of cities have developed fitness testing programs as an alternative to hiring age maximums.

Retirement:

—Nearly a quarter of all states do not have a mandatory retirement age or have a mandatory retirement age which complies with the ADEA (i.e. age 70).[28]

—The mandatory retirement age range for those states with mandatory retirement is 50 to 70.[29]

—A substantial number of cities have implemented fitness testing programs which better ensure a fit workforce than does mandatory retirement.

The wide variation in age limitations in public safety departments, and the total absence of such requirements in some departments, demonstrates that there is no need to set maximum age limitations for such departments.

States and Their Political Subdivisions Can Have Age Limitations for Public Safety Officers If They Prove Age Is a Bona Fide Occupational Qualification

The ADEA does not make all age limitations unlawful. An employer can use an age limitation where they can prove age is a "bona fide occupational qualification (BFOQ) reasonably necessary to the normal operation of the particular business."[30] The BFOQ standard applied in ADEA cases is similar to that applied in Title VII cases involving sex, race, national origin or religious discrimination.[31] Courts have held that government employers should not be treated differently from private employers in applying the BFOQ test.

The ADEA does not require that the states or their political subdivisions retain unfit public safety employees. As the Supreme Court said in Wyoming:

> [T]he Act requires the State to achieve its goals in a more individualized and careful manner than would otherwise be the case, but it does not require the State to abandon those goals....[32]

A State's BFOQ exception cannot be based merely on the basis of an employer's assumption that every employee over a certain age cannot safely and effectively perform the duties of that job. It is just such stereotyped notions of age-based incapacity that the ADEA sought to eradicate. There is no reason why states or their political subdivisions should be held to a lesser standard.

II. PERFORMANCE AND AGING

There are three assumptions that underlie the conclusion that age limitations are necessary to ensure physically fit public safety departments: abilities decline with age; all or nearly all workers over a given age have the same abilities; and, individual abilities cannot be assessed. The proponents of age limitations for public safety employees also assert that older workers are

particularly ill-equipped to perform the difficult, arduous tasks involved in law enforcement and firefighting.

Abilities associated with job performance do not invariably decline with age. As workers age, there is greater variation in their abilities, and in some cases there is improvement of certain skills and abilities with the added experience that comes with age. An individual's ability to perform his or her job can be measured. In fact, research on the job performance of older law enforcement officers and firefighters has shown an improvement in performance among older employees.

Job Related Abilities do not Inevitably Decline with Age

—Chronological age alone is a poor indicator of ability to perform on the job. Mandatory retirement at a fixed age does not take into account a worker's abilities and capabilities, which vary sharply from individual to individual.[33]

—Mandatory retirement policies often are based upon a misconception that older workers do not perform as well on the job as younger workers. However, several studies indicate that they perform as well as their younger counterparts and, in some cases, noticeably better.[34]

—Chronological age is not a useful predictor of intellectual competence.[35]

—Some performance changes that are commonly attributed to aging are in reality caused by disuse and are subject to correction.[36]

—Studies have shown high efficiency and reliability among older workers along with low turnover and low absenteeism.[37]

—There is no question that many persons over age 65 are still quite capable of working. A recent study of 132,316 workers in New York State agencies found that workers over 65 are "about equal to" and sometimes "noticeably better" than younger workers in job performance. They are at least as punctual in reporting to work, have fewer on-the-job accidents and are less often absent from work because of illness, accidents or unexplained reasons. The mandatory retirement age in most of the New York state agencies is 70.[38]

Improved Health of Americans Decreases Need for Mandatory Retirement

Americans are now living healthier, longer lives. As a result, the period during which they are productive has expanded dramatically. The continued use of mandatory retirement ages by the Federal government, the States and their political subdivisions is in conflict with this trend.

Studies have shown that:

—Mortality rates for individuals 25-69 years of age decreased by more than 25% between 1967 and 1976.[39]

—Between 1968 and 1980, there was a 29% drop in deaths resulting from heart disease.[40]

—Americans' improved diets, decrease in smoking, control of high blood pressure, and increase in exercise are all probable factors in our leading longer, healthier lives.[41]

These improvements in the health of Americans and our greater understanding of the aging process has led a prominent gerontologist to conclude:

> [I]f we had to select a chronologically meaningful retirement age (say, using the same criteria that might have led to age 65 when the social security laws were first written), it would now have to be at least a decade later than would have made sense 20 years ago.[42]

Performance of Older Law Enforcement Officers and Firefighters

Research that has been done on the performance of older law enforcement officers and firefighters supports the conclusion that job performance does not necessarily decline with age:

—Paul Davis, an exercise physiologist, has stated that age does not determine who can safely and adequately perform law enforcement or firefighter positions. His research has demonstrated that there are physically fit persons in all age groups.[43]

—Research by Isidore Silver and Edith Flynn reveals that the absence of hiring age limits for law enforcement officers has no bearing on the future success of applicants. They found that older officers had a lower rate of civilian complaints, absenteeism and turnover.[44]

—The judgment of older firefighters can be used for the benefit of the younger and less experienced personnel by warning them of the risks and hazards involved in the particular fire fighting situation.[45]

--The age of a firefighter contributes to the firefighter's knowledge and skill on the job; these benefits are reflected in statistics that reveal an inverse relationship between injury and age.[46]

The experience of numerous police and fire departments, as well as research, has shown that job performance does not inevitably decline with age. Many law enforcement and fire departments can, and do, test to determine their employees' fitness to perform their jobs.

Alternatives to Mandatory Retirement for Law Enforcement and Firefighting Personnel

It is the goal of the ADEA to "promote employment of older persons based on their ability rather than age. . . . ."[47] Mandatory retirement age and maximum hiring age limitations are in direct conflict with this goal.

The Equal Employment Opportunity Commission, the agency responsible for enforcing the ADEA, has issued an interpretive guideline which set forth the circumstances when a public safety employer can use age as a limiting criteria. The interpretation provides:

> [I]f the employer's objective in asserting a BFOQ is the goal of public safety, the employer must prove that the challenged practice does not indeed effectuate that goal and that there is no alternative which would better advance it or equally advance it with less discriminating impact.[48]

This limitation is similar to the standard a public safety employer would have to meet under Title VII of the Civil Rights Act of 1964 if it had a policy or practice that had an adverse impact on women or minorities. As the following analysis demonstrates, there are less age-discriminatory and economically feasible means to ensure a fit law enforcement or firefighting department. As a result, mandatory retirement in public safety departments is unwarranted.

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It is Possible to Test for the Ability of an Individual to Perform the Duties of Law Enforcement Officer or Firefighter

—Fire departments in Alexandria, Virginia; Dallas, Texas; Kansas City, Missouri; Los Angeles, California; New York City; Oklahoma City, Oklahoma; Phoenix, Arizona; St. Paul, Minnesota; and Seattle, Washington have had physical fitness and/or training programs.[49]

—At least 18 states have physical fitness/ programs for state police officers.[50]

Research on the City of Los Angeles fire department has shown:

—that you can test for an individual firefighter's fitness to perform his job;

—that through medical examinations, physical fitness testing and physical fitness training, the department has increased its fitness levels and reduced risk factors associated with atherosclerotic heart disease;

—that its fitness program has played a major role in reducing injuries occurring on duty;

—that front line firefighters in their 50's and 60's have passed their medical examinations; and,

—that its fitness program has proven to be cost efficient.[51]

—Research on fire departments with fitness programs also has shown an improvement in injury recovery time for firefighters.[52]

—John Hancock, former deputy sheriff in San Diego County's training division has stated that since the county abolished its maximum entry age requirement for deputy sheriffs in 1972, many trainees over the age of 40 have successfully completed the physical training course at its academy and are working successfully.

—Research has shown that there are accurate and economical ways to test physical fitness and predict levels of performance for public safety occupations.[53]

—Research conducted by Dr. Paul Davis has shown that age cutoff standards, when used as a job selection criterion, may be discriminatory and unreliable. In fact, many of the physically fit, older officers he tested demonstrated much better health and fitness profiles than the out-of-shape younger officers. The only judicious method of determining who is physically qualified for police work is to physically test applicants and incumbents.[54]

Cost Savings Associated with Physical Fitness Testing and Training Alterations

Some of those opposed to the use of physical fitness testing as an alternative to age limitations to ensure fitness argue that such methods are too costly. These claims are without merit.

—The City of Los Angeles was able to set up its physical fitness training program for about $5,000 for 120 work locations and has spent about $5,000 a year to maintain it.[55]

—The cost of the periodic fitness testing is between $150 and $250 per year per employee.[56]

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—The City of Los Angeles Fire Department fitness program has cut back on work-related disabilities which have been estimated to cost the city an average of $250,000.[57]

—Based on the experience of the City of Alexandria's Fire Department, the Department expects its fitness program will result in fewer early disability retirements, reduced loss time accidents, less use of sick and disability leave, and a healthier, more efficient fire department.[58]

Individual Costs Associated with Mandatory Retirement

In deciding whether to allow states and their political subdivisions to mandatorily retire or refuse to hire individuals solely on the basis of age, the cost to the affected individuals needs to be considered. The impact of hiring age restrictions and mandatory retirement age limits upon the individual employee are profound.

Some of the effects on individuals of hiring age limits are:

Veterans who are beyond the hiring age limits of law enforcement and fire departments are often barred from employment in those departments.

In Michigan, competent, laid-off Wayne County sheriffs could not find employment in other Michigan cities because of hiring age restrictions in those cities.

Women, who in the past were excluded from many law enforcement and fire departments because of sex discrimination, now are also excluded because of their age.

Individuals who are mentally and physically capable of serving as law enforcement officers or firefighters are denied employment solely because of their age.

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The adverse consequences of mandatory retirement ages are even better documented than the effects of hiring age restrictions. Regarding the role of work in our lives, it has been said:

> In our money-oriented society at least, paid work has a 'powerful positive impact on happiness, self-esteem and relationships with other people.'[59]

> We have come to realize that nothing erodes the older worker's personality more than enforced idleness. Nothing attacks human dignity and self-respect more tragically than joblessness. There is no meaningful measure of discouragement or the sense of personal failure; no way to trace the consequences in terms of the medical care that he and his family do not get; the drop in his family's day-by-day living standard; the slow attrition of skill and knowledge; the loss of status in the community; and the loss of faith in a social and economic order that indefinitely denies him the opportunity to do useful work.

> The impact of unemployment can change an older adult from a social and economic asset to a liability. In all too many instances, out of a sense of frustration and repeated failure, he eventually ceases to actively seek employment. Soon he is no longer represented in the statistical computations which record the unemployed.[60]

The medical profession also has recognized the threat mandatory retirement poses to an individual's physical and mental health. The American Medical Association has taken the position that:

> Enforced idleness robs those affected of the will to live full, well-rounded lives, deprives them of opportunities for compelling physical and mental activity

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and encourages atrophy and decay.[61]

> Compulsory retirement on the basis of age will impair the health of many individuals whose job represents a major source of status, creative satisfaction social relationships or self-respect. It will be equally disastrous for the individual who works only because he has to, and who has a minimum of meaningful goals or interests in life, job-related or otherwise. Job separation may well deprive such a person of his only source of identification, and leave him floundering in a motivational vacuum with no frame of reference whatsoever.[62]

Dr. Emanuel Tanay,[63] a psychiatrist who has studied the psychological problems resulting from mandatory retirement, has said:

> Loss of work role leads to loss of self-esteem. . . . Thus, work deprivation leads to a psycho-social regression which can lead to anxiety and depression. . . . Work Deprivation Depression may result in a major depressive illness.[64]

The Courts have also noted the effects of mandatory retirement. The Supreme Court, in the Wyoming case, noted that mandatory retirement "inflicted on individual workers the economic and psychological injury accompanying the loss of the opportunity to engage in productive and satisfying occupations."[65] Supreme Court Justice Thurgood Marshall, in his dissenting opinion in Massachusetts Board of Retirement v. Murgia said:

> While depriving any government employee of his job is a significant deprivation, it is particularly burdensome when the person deprived is an older citizen. Once terminated, the elderly cannot readily find alternative employment.

> The lack of work is not only economically damaging, but emotionally and physically draining. Deprived of his status in the community and of the opportunity for meaningful activity, fearful of becoming dependent on others for his support, and lonely in his new-found isolation, the involuntarily retired person is susceptible to physical and emotional ailments as a direct consequence of his enforced idleness. Ample clinical evidence supports the conclusion that mandatory retirement poses a direct threat to the health and life expectancy of the retired person, and these consequences of termination for age are not disputed by appellants. Thus, an older person deprived of his job by the government loses not only his right to earn a living, but, too often, his health as well, in sad contradiction of Browning's promise: 'The best is yet to be, The last of life, for which the first was made.'[66]

As Justice Marshall so eloquently suggested, depriving older government employees of their jobs is particularly burdensome. Because of age discrimination, which is still prevalent, mandatorily retired law enforcement officers and firefighters are unlikely to find work. If Congress amends the ADEA to allow states to retire public safety officers mandatorily, these individuals too will suffer the effects of mandatory retirement and enforced idleness.[67]

Economic and Social Costs Resulting From Allowing State and Local Governments to Impose Mandatory Retirement

There are substantial economic and social costs associated with removal of state and local governments from the ADEA's jurisdiction. Research on the costs associated with mandatory retirement have shown:

> Age discrimination in employment is costly to society and to individuals.

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Longer-term unemployment among older workers is one such cost. Nearly two million person years of productive time are lost to the workforce because of unemployment among older workers.[68]

More than 400,000 person/years of productive labor are lost annually to unemployment among those 55 and older.[69]

As a result of mandatory retirement, thousands of Americans are forced to retire annually. As a result, "their skills, knowledge and wisdom are lost and their opportunities to instruct, teach, consult or advise, listen, and reflect, as well as to work, are cut off."[70]

Mandatory retirement results in an increasing strain on the Social Security system.

III. CONTINUED PROTECTION OF LAW ENFORCEMENT OFFICERS AND FIREFIGHTERS WILL NOT IMPAIR THE FUNCTIONING OF STATE AND LOCAL GOVERNMENT

The ADEA's application to state and local law enforcement and fire departments, it is argued, has an adverse impact on the functioning of state and local governments. Proponents of this "states rights" argument claim: 1) the inability to set age limitations will impair State and local governments' ability to ensure that public safety employees are physically fit; and 2) eliminating existing age limitations will be extremely costly for state and local governments.

In contrast to these arguments, evidence presented below suggests that the ADEA's application to State and local law enforcement and fire departments will not impede their ability to ensure a fit workforce and may even benefit state finances.

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The idea that younger law enforcement officers and firefighters are inherently more fit and therefore more competent is exactly the type of stereotype Congress sought to challenge when it extended the ADEA's jurisdiction to government workers. As a 1973 Senate Committee report held:

> There is . . .evidence that, like the corporate world, government managers also create an environment where young is sometimes better than old.[71]

In 1974, the ADEA was amended to cover the federal, state and local governments. The ADEA's extension to states and their political subdivisions has not impeded their ability to ensure a fit workforce. As the Supreme Court in Wyoming notes:

> Under the ADEA, however, the state may still, at the very least, assess the fitness of its game wardens and dismiss those wardens whom it reasonably finds to be unfit. Put another way, the Act requires the state to achieve its goals in a more individualized and careful manner than would otherwise be the case, but it does not require the state to abandon these goals, or to abandon the public policy decisions underlying them.[72]

It is also important to point out that the ADEA does not require all state and local governments to employ law enforcement officers and firefighters until they are seventy years old. The Supreme Court in Wyoming held:

> Perhaps more important, appellees (the State of Wyoming, et al.) remain free under the ADEA to continue to do precisely what they are doing now if they can demonstrate that age is a 'bona fide occupational qualification' for the job of game warden.[73]

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The assertion that the ADEA's application to law enforcement officers and firefighters will be too costly for State and local governments is, at best, speculative. The Supreme Court, in Wyoming, examined this argument. The Court said:

> In this case, we cannot conclude from the nature of the ADEA that it will have either a direct or an obvious negative effect on state finances. Older workers with seniority may tend to get paid more than younger workers without seniority, and may by their continued employment accrue increased benefits when they do retire. But these increased costs, even if they were not largely speculative in their own right, might very well be outweighed by a number of other factors: Those same older workers, as long as they remain employed, will not have to be paid any pension benefits at all, and will continue to contribute to the pension fund. And, when they do retire, they will likely, as an actuarial matter, receive benefits for fewer years than workers who retire early.[74]

The proposed elimination of the ADEA's coverage of these law enforcement officers and firefighters could be quite costly for the state and local governments and would result in an increased drain on our already strained Social Security system. A number of computer-based models were designed in the Equal Employment Opportunity Commission's Office of Legal Counsel to provide estimates of the costs and benefits of Social Security taxes and payments at different ages for police and fire personnel. These models estimated costs of retirement at ages 62, 65 and 70. In each instance the costs to the potential recipient and the difference in costs and benefits for the federal government were estimated. The models included actual estimates of the number of state and local police and fire personnel who are covered by Social Security (30% of total) and their average salary ($23,470).

A brief review of the models indicate that the difference in costs of Social Security benefits and changes in taxes collected varied greatly depending on the age the person chose to retire. For example, if each police officer and firefighter is allowed to work until age 70, and all do so, the government will collect over $35,000 in additional payroll taxes from each and would have paid out nearly $100,000 less in benefits than would have been paid between ages 62-69. Correspondingly, if the individual had chosen to retire at age 65 the government would have collected an additional $10-11,000 in payroll taxes from the extra 3 years the person worked.

When the figures are considered for all of the law enforcement and firefighter personnel age 55 and over who are covered by Social Security, the savings rise significantly. For example if all of these individuals worked until age 70, instead of being forced to retire at or before age 62, the government would collect an additional $1.4 billion in payroll taxes and would pay out $4.5 billion less in benefits, for a total savings of $5.9 billion. Correspondingly, if the whole group retired at age 65 instead of being forced out at age 62 or earlier, the total savings to Social Security would be $1.6 billion.

This analysis illustrates the benefits to the Federal Treasury of police and firefighters delaying their retirement date. Obviously, not all police/fire personnel would like to work to age 70 or even age 65. But, forcing these individuals to retire denies them the opportunity to continue working and adds to the burdens on the Social Security system. Similar savings for state and municipal retirement systems would be achieved by allowing police and firefighters to work longer.

Conclusion

Mandatory retirement of competent law enforcement officers and firefighters is unnecessary and wasteful. The federal government's failure to recognize this problem should not be compounded by allowing states and their political subdivisions to also discriminate against their employees based on age. The states and their political subdivisions should, in accordance with the goals of the ADEA, test their public safety officers for fitness rather than make stereotyped assumptions of incapacity due to age.

To allow state and local law enforcement and firefighting agencies to discriminate based on age would raise serious questions regarding Congress' intent to prevent age discrimination in employment.

FOOTNOTES

[1]E.E.O.C. v. Wyoming, 103 S.Ct. 1054 (1983).

[2]S. Rep. No. 95-493, 95th, Cong., 2d Sess. 3, reprinted in /1978/ U.S. Code Cong. and Ad. News 505-506.

[3]Section 2(b), 29 U.S.C. Section 621(b).

[4]Public Law 80-168 (80th Congress, 1947).

[5]Public Law 80-879 (80th Congress 1948).

[6]Public Law 80-854 (84th Congress 1956).

[7]Public Law 92-297 (92nd Congress 1972).

[8]Public Law 92-382 (92rd Congress 1972).

[9]Public Law 93-350 (93rd Congress 1974).

[10]Robert Butler, Why Survive? Being Old in America, p. 71 (Harper and Row, 1975).

[11]Special Retirement Policy for Federal Law Enforcement and Firefighter Personnel Needs Reevaluation, Report to the House Committee on Post Office and Civil Service by the Comptroller General of the United States, February 24, 1977.

[12]Id. at 6.

[13]Id. at 10.

[14]Id. at 11.

[15]Id. at 12.

[16]Report on Special Retirement Policies as related to mandatory retirement for law enforcement officers, firefighters, and air traffic controllers, report to the Subcommittee on Compensation and Employee Benefits of the House Committee on Post Office and Civil Service, 62 (August, 1981).

[17] Id.

[18] Id. at 63.

[19] Id. at 36.

[20] Id. at 36.

[21] Isidore Silver and Edith Flynn Police Selection Maximum Age Standards - A Review of the Literature (unpublished report).

[22] Selecting Police Officers, p. 12, Metropolitan Area Management Association and the Metropolitan Council, 1980.

[23] Paul Davis has had considerable experience in working with firefighters and law enforcement officers. He has worked with the U.S. Fire Administration as well as Alexandria, Arlington, Fairfax and Prince William Counties in developing physical assessment programs for firefighters. He has also worked on developing physical fitness testing programs for the FBI, Secret Service, Marshalls Service, Marine Corps, U.S. Park Police, and U.S. Border Patrol. Dr. Davis has also done considerable research on the factors, including age, that might influence the performance of law enforcement officers and firefighters. See, e.g., Paul O. Davis and Howell F. Wright, Elements of a Recruit Selection Process. Fire Command, 46: 12-13, January, 1979.

[24] Report on Special Retirement Policies as Related to Mandatory Retirement for Law Enforcement Officers, Firefighters and Air Traffic Controllers, supra, note 16 at 35-36.

[25] Id. at 62.

[26] Kenneth Christian, State Police/Highway Patrol Agencies in the United States: Survey of Selected Personnel Practices, 1983.

[27] Id.

[28] Id.

[29] Id.

[30] Section 4 (f) (2), 29 U.S.C. Section 623 (f)(2).

[31] 42 U.S.C. 2000e-2(e).

[32] E.E.O.C. v. Wyoming, supra, note 1 at 1062.

[33] The Next Steps in Combating Age Discrimination in Employment: With Special Reference to Mandatory Retirement Policy, A Working Paper prepared for use by the Special Committee on Aging, United States Senate (95th Cong. 1st Sess. 1977), p. 20.

[34] Id. at 21.

[35] K. Warner Schaie, Translations in Gernotology - From Lab to Life, Intellectual Functioning, American Psychologist, November, 1974, pp. 802-806 at p 806.

[36] Walter M. Bortz, Disuse and Aging, Journal of the American Medical Association, September 10, 1982, Vol. 248, No. 10, pp. 1203-1208.

[37] Why Survive? Being Andrew Old in America, supra, note 10 at 76; and, W. Andrew Achenbaum, Old Age in the New Land: The American Experience Since 1790, p. 154 (Baltimore: Johns Hopkins University Press, 1979).

[38] Improving the Age Discrimination Law, A Working Paper prepared for the Senate Special Committee on Aging, United States Senate (93rd Cong. 1st Sess. 1973), p 15.

[39] Health - United States, U.S.D.H.E.W. Publication No. 78-1232, 1978, p. 169.

[40] Heart-Disease Deaths Ebbing, UPI report published in The Washington Post, page A-2 (April 28, 1984).

[41] Id.

[42]Translations in Gerontology - From Lab to Life, Intellectual Funtioning, supra, note 35 at 806.

[43]See note 23, supra.

[44]Police Selection Maximum Age Standards - A Review of the Literature, supra, note 21.

[45]Aaron v. Davis, 414 F. Supp. 453, 459, (E.D. Ark. 1976).

[46]Statement of Paul Davis, supra, note 23.

[47]Section 2(b), 29 U.S.C. Section 621 (b).

[48]29 C.F.R 1625.6(b).

[49]See, e.g., Paul Davis and Arthur Curtis, The Firefighter's Survival Manual: A Guide to Physical Fitness National Fire Protection Association, 1982.

[50]State Police/Highway Patrol Agencies in the United States: Survey of Selected Personnel Practices, supra, note 26.

[51]See R. James Barnard, Ph.D. and Donald F. Anthony, Effect of Health Maintenance Programs on Los Angeles City Firefighters, Journal of Occupational Medicine, Vol. 22, No. 10/October, 1980, pp. 667-669; Good Health Through Physical Fitness, Los Angeles City Fire Department, 1971.

[52]Cindy C. Rogers, Firing Up for Fitness, The Physician and Sports Medicine, April, 1984.

[53]Paul O. Davis, Dispelling the Aging Myth, report prepared for the Equal Employment Opportunity Commission (1980).

[54]Paul O. Davis and Albert M. Stark, Age vs. Fat: Effect on Physical Performance of Police Officers, FBI Law Enforcement Bulletin, Vol. 49, pp. 10-15 at p. 15 (1980).

[55]Statement of Deputy Chief Donald F. Anthony of the City of Los Angeles' Fire Department.

[56]Id.

[57]Id.

[58]Jack Beam and Paul O. Davis, Pay-Offs of a Physical Fitness Program, The International Fire Chief, June, 1979; and, subsequent conversation with Paul Davis.

[59]Why Survive? Being Old in America, supra, note 10 at 74. (Citation omitted.)

[60]Id. at 91 quoting from United Community Service of St. Joseph County, Inc. Project ABLE (Ability Based on Long Experience), Final Report Contract No. MDS37-64, Older Worker Employment, South Bend, Indiana, December, 1965.

[61]The Next Steps in Combating Age Discrimination in Employment: With Special Reference to Mandatory Retirement, supra, note 45 at 33, quoting Sharon House, "Mandatory Retirement," Library of Congress, Congressional Research Service, 76-157-ED, August 20, 1976, p. 13.

[62]American Medical Association Committee on Aging, Retirement: A Medical Philosophy and Approach, at 2 (1972).

[63]Dr. Tanay had the opportunity to observe the effects of mandatory retirement on individuals as a result of work he has done with the U.S.Veterans Administration and with the Social Security Disability Determination Service. See, also, Dr.Emanuel Tanay, Mandatory Retirement, Law Enforcement Communications, April, 1981.

[64]Dr. Emanuel Tanay, Work Deprivation Depression, The Psychiatric Journal of the University of Ottawa, September, 1983, Vol. 8, No. 3, pp. 139-144 at 143.

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[65] E.E.O.C. v. Wyoming, supr,a note 1 at 1058, citing a report of the Secretary of Labor.

[66] 427 U.S. 307, 323-24 (1976). (Citations ommitted.)

[67] It is well documented that older workers, once unemployed, remain without work for longer periods of time than other age groups. See, Why Survive? Being Old in America, supra, note 10 at 69; The Next Steps in Combating Age Discrimination in Employment: With Special Reference to Mandatory Retirement, supra, note 33 at 19.

[68] Inside Views of Corporate Age Discrimination, Hearing Before the House Select Committe on Aging (97th Cong. 2nd Sess. 1982), p. 107.

[69] The Unemployment Crisis Facing Older Americans, Hearing Before the House Select Committee on Aging (97th Cong. 2nd Sess. 1982), p. 61.

[70] Why Survive? Being Old in America, supra. Note 10 at 65; See, also, Special Retirement Policy for Federal Law Enforcement and Firefighter Personnel Needs Reevaluation, supra, note 11 at 26.

[71] Improving the Age Discrimination Law, supra, note 38 at 14.

[72] E.E.O.C. v. Wyoming, supra, note 1 at 1062.

[73] Id.

[74] Id. at 1063. (Citation omitted.)

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APPENDIX I

Chronology of Legislation Affecting Federal Public Safety.

1. Public Law 80-168
   -Approved July 7, 1947
   -Purpose of liberalized benefits
   --Incentive to remain in federal service
   --Reward for arduous, hazardous work
   --Maintain vigorous and youthful workforce.
   --Government would not lose highly qualified agents through early retirement because attorney general would only approve applications of those individuals who could not operate at their former level of efficiency.

2. Public Law 80-879
   -Approved July 2, 1948
   -Extended benefit to other Federal employees in similiar positions.
   -Head of agency responsible for recommending, on individual basis, applications for preferential retirement, subject to CSC approval (hazard of individual's job).

3. Public Law 81-235
   -Approved August 16, 1949
   -Adjusted pension benefit calculation
   -Benefitted those reassigned to lower positions because of poor health.

4. Public Law 84-854
   -Approved July 31, 1956
   -Expanded definition of "detention" /eligibility criterion/ to include most non-guard prison personnel.

5. Public law 92-382
   -Approved August 14, 1972
   -Federal firefighters covered

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6. Most Recent Legislation 93-350
   -Approved July 12, 1974
   -Hazard eliminated as eligibility criterion
   -Agency and Office of Personnel Management approval removed
   -Effective January 1, 1978, law enforcement officers and firefighters became subject to automatic separation at age 55 provided they had 20 years of service. Agency head could extend to age 60 if public interest so required.
   -Agency head authorized to set minimum and maximum age limits for original appointment.

APPENDIX II

HEALTH AND PERFORMANCE APPRAISAL OF WORKERS IN CERTAIN OCCUPATIONS EXEMPT FROM THE AGE DISCRIMINATION IN EMPLOYMENT ACT AS AMENDED IN 1978

Prepared for the U.S. House of Representatives
Select Committee on Aging[1]

by
Carol C. Hogue, R.N., Ph.D.
Associate Professor, Nursing
Assistant Professor, Community and Family Medicine
Senior Fellow, Center for the Study of Aging
and Human Development
Duke University
Durham, North Carolina 27710

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TABLE OF CONTENTS

Executive Summary

I. Introduction

II. Police and Firefighting Work: Background

A. Police Work

B. Firefighting

C. Co-similarities Between Police and Firefighters

III. Predicting Performance of Older Workers

A. Selected Health Trends

B. Individual Differences in Aging

C. Additional Considerations in Assessing Workers

D. Description of Jobs and Assessment of Individuals

Job Analysis

Performance Appraisal

Combining Job Analysis and Performance Appraisal

IV. Conclusions and Implications

V. Appendixes

A. Selection of Patrol (Police) Officers

B. Firefighter Selection

C. Brief Descriptions of Selected Job Analysis Systems

D. Testing the Physical Abilities of Job Applicants

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Executive Summary

The Age Discrimination in Employment Act, as amended in 1978, forbids discrimination against workers age 40 to 70 on the basis of age, with a few exceptions. This report is designed to provide information which might inform future policy development related to those occupational groups which are exempt from the ADEA, especially police officers and firefighters.

Sections I and II of the report indicate that age cutoff standards may be discriminating and unreliable for both police officers and firefighters. In both occupations, positions appear to combine occasional demands for difficult physical performance with rather ordinary, non-stressful service, although firefighters, more than police, are subject at times to very heavy work in extreme temperatures. Neither group has a consistent retirement policy, and there appears to be no logical reason for claiming that age is a bona fide occupational qualification.

Section III points to the difficulties in predicting performance of older workers on the basis of age and presents health trends and mortality rates over the past few decades, particularly in relation to heart disease. This section also presents recent research in the health sciences and gerontology pointing to individual differences in aging and differences between the effects of aging and disease. Finally the section discusses empirical, objective assessment of older workers through job analysis and performance appraisal. The model of Avolio and Panek combining both job analysis and performance appraisal is presented, and examples of performance appraisal based on job analysis are described, including the Alexandria, Va., Fire Department system now used as a guide across the country.

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Section IV of the report presents the following conclusions:

1. Older Americans are healthier today than 20 years ago. Mortality rates for adults have declined, primarily in the area of cardiovascular disease.

2. Declines in performance previously thought to be both age related and inevitable are now in many instances known to be functions not of aging, but of disease -- and are not inevitable.

3. There are measures available for assessing the performance of police officers and firefighters; these tests are job related, feasible, and have reliability and validity reported. Such measures should be used for selection, retention, and retirement decisions, with information on individuals accumulated over time.

4. There is no apparent reason for the continuation of mandatory retirement for healthy, motivated and competent police officers.

5. For firefighters, the combination of sedentary activity with intermittent demands for bursts of strength in extreme temperatures appears to place workers at greater risk than police. Systematic fitness programs based on job analysis are already in effect, however, and may soon provide evidence to support abolition of mandatory retirement for firefighters.

6. More research on work is needed, particularly to illuminate the way the work environment affects health and well being and the way individuals adapt to this environment.

7. Emphasis on health promotion is needed among working people.

This report was written by a gerontologist with training in epidemiology and experience in the areas of work and health. It is based on interviews with experts in the fields of firefighting, police work, job analysis and performance appraisal, and on an extensive review of published and unpub-

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lished literature. In addition to legislators, the report should be useful to employees, employers, attorneys and researchers.

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Health and Performance Appraisal of Workers in Certain Occupations Exempt from the Age Discrimination in Employment Act (ADEA) as Amended in 1978

I. Introduction

The 95th Congress enacted the 1978 Amendments to the Age Discrimination in Employment Act (ADEA) to promote employment of older persons based on their ability rather than their age, to prohibit arbitrary age discrimination in employment, and to assist employers and workers to deal with problems arising from the impact of age on employment (Section 621b).

The amended ADEA forbids discrimination against workers 40-70 on the basis of age, with a few exceptions. This paper focuses on those exceptions; that is, it addresses issues related to the employment of older workers in occupations which have been declared exempt from the 1978 amendments to the ADEA. Although employers of several occupational groups (commercial airline pilots, test pilots, and air traffic controllers; bus drivers, police officers; and firefighters) presently claim exemption from the ADEA on the basis of age as a bona fide occupational qualification (BFOQ), the paper deals primarily with police officers and firefighters. While executives of certain levels (those entitled to pensions of at least $27,000) and university professors (until July, 1982) are also exempt from consideration, this report will not directly address issues specific to those two groups, though it will have implications for executives and university faculty.

The Secretary of Labor has promulgated regulations which state that the age as BFOQ exemption is of limited scope and should be construed narrowly. However, if an employer can show that:

(1) the age limitation is reasonably necessary to the conduct of the business, and

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(2) there is factual basis to believe that all or substantially all employees over a certain age would be unable to safely and efficiently perform the duties of the job,

an age limitation can be established. In addition, if an employer demonstrates that it is impossible or highly impractical to deal with persons over a particular age on an individual basis, the employer may apply a reasonable general rule, i.e., establish an age restriction.

The United States Supreme Court has not heard age discrimination (age as BFOQ) cases, but a number of lower court cases have been recorded in which the application of the BFOQ was challenged, especially in occupations concerned with public safety. Review of those court cases is only moderately helpful since decisions in one jurisdiction are not binding on cases in other jurisdictions; therefore, no detailed information will be given here. Reviews are available elsewhere, however. In brief, the BFOQ has been upheld by one or more courts for commercial airline pilots and test pilots, bus drivers, law enforcers and firefighting personnel either because it was shown that 1) after a certain age all or nearly all workers could not perform safely or effectively, or 2) it was contended that individual assessment of workers was either undeveloped or impractical. Those two issues are the focus of this report.

Refinements of the report should ultimately interest a varied audience: workers, who wish to be informed about matters related to their work, an important source of self-esteem in their lives; managers, who wish to make informed management decisions and increase productivity; attorneys involved in the litigation of age discrimination in employment cases; members of Congress developing legislation; and researchers who study age and work performance. The report is but a first step in an area that needs much more work. At present only limited empirical data are available. Thus we can

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only examine the data we have, draw tentative conclusions, raise questions, and suggest needs for additional research.

Specifically, here we will provide some background on the functions, performance and demands of police and firefighters, describe the difficulties involved in predicting performance on the basis of age, and touch on considerations related to assessing workers. Then we will describe two bases of empirical objective assessment -- job analysis and performance appraisal, and set forth a model for combining the two. Finally, we will present tentative conclusions and implications. The report is based on interviews with experts in the fields of firefighting, police work, job analysis and performance appraisal and on an extensive review of published and unpublished literature.

II. POLICE AND FIREFIGHTING WORK: BACKGROUND

Several kinds of firefighters and police are included in the Department of Labor category "protective service personnel," but this report is limited to issues related to the greatest numbers of protective service personnel -- police and firefighters employed by state and local governments across the country. Both firefighters and police are generally expected to minimize loss of life and property and promote the safety of citizens in their jurisdictions. While there are some similarities in the work and therefore in the assessment of the two occupational groups, and both have claimed exemption from the ADEA under the BFOQ, there are substantial differences in the nature of policing and firefighting. Because of those differences we will review police and firefighting work separately, noting commonalities when appropriate.

A. Police Work

According to the National Advisory Commission on Criminal Justice Standards and Goals, the overall purpose of police service in America is "to

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preserve the peace in a manner consistent with freedoms secured by the constitution" (Police, 1973, p. 13). Silver and Flynn (1980) and Flynn (1980), who have reviewed the history of police work in this country, note that police agencies are consistently an integral part of local government. But while they are semi-military agencies, rigidly adhering to inflexible standards, there are actually no universally accepted professional standards for police.

Moreover, perceptions of police function vary. The public sees police function as crime fighting or traffic control. The media show crime fighting; the citizens encounter traffic control -- and the police argue that if they are not mainly crime fighters, they should be.

Those who systematically study police function (sociologists, psychologists, criminologists, management and systems analysts, national commissions) describe great diversity in the functions of police, and point out that little time is spent encountering violence. For example, a study of more than 18,000 calls to a small city police department between February and May 1976 found that 60% were for information and 13% for traffic problems, while less that 3% involved violence (Lilley, 1978, quoted by Silver and Flynn). Silver and Flynn conclude that the common core of police work appears to be routine patrol, peacekeeping, order maintenance and service, rather than crime fighting.

What police officers actually do in the field may be quite different from activities used as selection criteria. Furthermore, systematic observations of police officers during their work yield "a different picture of police work that obtained when officers or their supervisors completes questionnaires" (Metropolitan Area Management Association and the Metropolitan Council, 1980, p. 3).

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Flynn (1980) had reviewed studies of police performance over the past decade, including an eleven-year cohort study of 1,608 New York City Police officers by Cohen and Chaiken (1972); a national probability sample of 500 Sheriff's deputies by Pitchess (1973); a nine-city study of 1,817 police officers for the Law Enforcement Assistance Administration done by Dunnette and Motowildo (1976); the McGowan and Riley (1975) study in the Portland, Oregon police department; Project STAR (System Training and Analysis of Requirements for Criminal Justice Participants) a multimillion dollar, three and one-half year effort by four states and hundreds of local criminal justice agencies; and a study by Lifson, Wilson, Ferguson and Winick (1977) for the Houston Police Department, independent of but parallel to the STAR project. Summarizing this work, Flynn comments that "studies devoted to a comprehensive job analysis of police roles, tasks, and performance objectives stress the importance of psychological traits and characteristics such as maturity, emotional stability, self-restraint, high ethical standards, resourcefulness, shrewdness, increased analytical capacity, autonomy, and flexibility." She notes that throughout the studies she reviewed, physical fitness requirements were found to be subordinate to these psychological traits (Flynn, 1980, pp. 68-69).

One of the most carefully done recent studies is the study of the Twin Cities Area Suburban Police Departments in Minnesota, "Selecting Police Officers " (1980, Metropolitan Area Management Association and the Metropolitan Council). The M.A.M.A. study was done in three phases over a four year period to develop nondiscriminatory selection standards and procedures for use by suburban police departments in the Twin Cities area. The second and third phases of the study are especially relevant here. In Phase 2, data were collected on the day-to-day activities that police

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officers actually perform, and police officer characteristics and abilities considered necessary for effective performance were identified.

The sampling procedure ensured representation of each classification group, each of the 55 police departments involved, each day of the week and each patrol shift. Job analysts spent over 775 hours with the 285 patrol officers during patrol shifts. More than 60 officers wore electrocardiogram monitors to show cardiac effects of activities during the patrol shift. Interviews were conducted with officers immediately after shifts to gain information on their functions, and additional interviews with 94 officers yielded information about the critical, emergency or physically threatening incidents experienced over the previous year of patrol work.

Findings in this phase of the study showed that the activities of the eight female officers did not differ significantly from the activities of the 277 male officers, and that "almost all work time of patrol officers entailed routine patrol, handling traffic administrative functioning. Although nonroutine activities such as critical, emergency or physically threatening activities were not found to be a large percent of the total time spent, they occurred fairly frequently (about once a month). These almost always entailed handling medical emergencies or domestic disputes" (p. 3). "Overall," the study concluded, "the basic factors, of observation, analyzing information, decision-making, oral and written communication were most critical to successfully performing the job. Little demand for physical activity, such as running or lifting, was observed," (p. 12).

Following the job analysis study, "a representative panel of 253 adult and youth citizens, police officers, police chiefs and city managers drawn from each department classification assessed the relative importance of 71 police activities defined during the job analysis study..." Then "a team of 11 experts, including psychologists, police training and administrative

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experts, and cardiology, physiology and legal consultants, reviewed the results of the job analysis. The panel then developed a list of the knowledge, abilities, and personality and physical characteristics essential to effective patrol officer performance... The panel was required to document or justify the basis for each requirement by referring to specific activities or behavior that the job analysis is showed to be a part of patrol work" (p. 14).

In addition to mathematical and both written and oral communication abilities, problem-solving abilities and factual recall abilities, a number of personal characteristics were determined to be essential to successful performance, including willingness to perform despite danger or discomfort, assertiveness, cooperativeness and lack of prejudice, decisiveness, interest in learning, honesty, dependability, and emotional stability and tolerance of stress. The physical attributes found relevant of consideration included hearing acuity, color and depth perception, and strength and conditioning. (The complete list of abilities is given in Appendix A).

Phase 3 of the M.A.M.A. study was a validation study, whose overall purpose was to use the information from the job analysis to develop job-related procedures for screening entry-level police officer applicants. Specifically, the validation study was "concerned with selecting the essential abilities and characteristics and determining what kinds of tests and examinations would best measure these abilities and characteristics (p. 2). Criterion validity was determined by comparing scores on performance ratings with scores on the tests and examinations that comprised the predictor measures. The M.A.M.A. study is a useful example of a systematic, careful approach to determining what police officers actually do and how those tasks can be measured -- both essential prerequisites to individual assessment.

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In another recent study, which looked at five measures of efficiency of the Boston Police Department (60% sample), preliminary data analysis has shown that age alone is not related to performance (Flynn, Personal Communication, 11/17/81). The investigator in that study, Flynn made an interesting observation: recently a number of younger police officers in the department were laid off because of financial distress experienced by the city government; however, no less capability of the police force was noted after the median age increased.

Davis and Stark (1980 b, p. 15), writing about their study of 671 male and female police officers in the Washington, D.C., metropolitan area, suggest that "age cutoff standards...may be discriminatory and unreliable." They found that "many of the physically fit, older officers...demonstrated much better health and fitness profiles than the out-of-shape younger officers." Davis and Stark conclude that "the only judicious method of determining who is physically qualified for police work is to test physically applicants and incumbents."

A number of recent studies thus raise questions about the use of age as a bona fide occupational qualification for police officers.

B. Firefighting

Flynn (1980, p. 84) notes that the duties performed by firefighters include safeguarding life and property as well as physically demanding activities such as entering burning buildings to evacuate and rescue persons in danger, and also less demanding duties such as maintaining equipment. Flynn concludes that police and firefighters' duties are comparable in many ways and "also similar in terms of physical and psychological stress" (Ibid, p. 84). There is no evidence available to make this kind of comparison, however, and to the outsider, it appears that the demands of firefighting may be both more extreme and more sporadic then those of police work. Long

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periods of relative inactivity are interspersed with sudden bursts of great responsibility which involve handling heavy equipment, sometimes for long periods, often in extreme heat and, sometimes, because of the greater incidence of house fires in wintertime, in extreme cold. The firefighter's rescue activities have the added pressure of urgency.

In vanRijn and Payne's (1980) criterion-related validity study for the D.C. firefighter selection test, more than 150 tasks (listed in Appendix B) were organized according to 12 "duty functions." Those duty functions included (vanRijn and Payne, 1980, p. 105) "Responding to Alarms; Performing General Firefighting Operations; Performing Ladder Truck and Related Operations; Preparing Fire Extinguishing and Related Operations; Performing Salvage and Overhaul Operations; Performing Special Emergency Operations; Maintaining Apparatus and Equipment; Providing First Aid and Assistance; Inspecting; Investigating; and Code Enforcing Activities; Training; General Management, Administration, Housewatch, and Related Activities; and Performing Public Relations and Community Activities."

In another study by Dotson, Santa Maria, Davis, and Schwartz (1978) for the National Fire Prevention and Control Administration, relationships between firefighting ability and selected physical characteristics of firefighters were investigated. One hundred experienced, professional firefighters randomly selected (stratified by age and jurisdiction) from the Metropolitan D.C. area were screened for cardiovascular disease, tested for physiologic performance, and scored on five criterion simulated firefighting activities. The job activities were studied empirically and objectively.

To be included in the study, each activity had to meet one or more of the following criteria: 1) frequently performed, 2) critical in nature, 3) physiologically stressful, 4) quantifiable in terms of time for completion and 5) required minimal instruction. The criterion tasks

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selected were ladder work, standpipe section carry, hose pull with rope, simulated rescue carry, and similated chopping. Dotson and his colleagues found two physical performance factors operating in the simulated firefighting activities: "high aerobic energy involvement" and "resistance to fatigue." The investigators noted that "the physical performance variables best predicting high aerobic energy involvement included maximal heart rate, sit-ups, grip strength, age and submaximal oxygen pulse. The physical performance variables best predicting resistance to fatigue included lean body weight, maximal heart rate, final treadmill grade, age and percent fat." It was concluded that successful completion of firefighting tasks requires a physical performance profile reflecting youth, high aerobic capacity, high muscular strength and endurance, above average lean body weight and minimal body fat. In general, performance declined with age. There were, however, important exceptions. When the firefighters were divided into two fitness groups based on their performance on criterion tasks, some of the "older" (in their forties) firefighters had physiologic performance as good as young subjects. Although weight (#184 mean weight) was nearly identical in both fitness groups, there was a marked difference between the two fitness groups in percentage of body fat (15.5% vs. 24.2%). Thus, while the details of the multivariate analysis are not presented, the data strongly suggest that body fat, not age, is associated with decline in fitness. This finding was supported by the findings of a similar study of over 600 firefighters (Davis and Stark, 1980). In that study, when the effect of body fat was held constant, the effect of age on performance was almost nonexistent.

Firefighters are generally thought to have particularly high rates of heart disease as a consequences of heavy work in extreme temperatures. While the rates will not be discussed here, it is useful to note that

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factors other than exertion and extreme temperature have been implicated as contributing to heart disease in firefighters. In a study of firefighters in Finland, from large, medium-sized and small brigades, psychological and biochemical indicators of strain showed that service in the alarm center -- the place were emergency calls were received and transmitted to responding units -- was more burdening than most traditional firefighting activities. Adrenal activity, marked by 17 ketogenic steroids, adrenaline and noradrenaline, parallels the response to both physical and psychological stress. In the Finnish study, those biochemical stress indicators showed high activation, and findings on the questionnaire used in the study paralleled the biochemical indicators (Kalimo, et al., 1980).

In another study by Barnard and Duncan (1975), continuous ECG recordings for 24 hours showed that the firemen studied not only had sustained high heart rates while fighting fires, but also showed marked increases in heart rate 15-30 seconds after an alarm sounded, as well as somewhat later on the truck approaching a fire. The increase in heart rate, a sign of anxiety, sheds additional light on the high rate of ischemic heart disease in firefighters -- apparently only partly related to heavy work in extreme temperatures and to inhaling pollutants.

Thus, while firefighters appear to be subject to more extreme demands than police, the demands are not always physical. This, like the studies of firefighters' performance, raises questions about the use of mandatory retirement as a means of ensuring physical fitness among firemen.

C. Similarities Between Police and Firefighters

While similarities between police and fireworkers are not central to this report, a few commonalities bear mention. In both groups assessments tend to be made at job entry and never again. Exceptions to that tendency are the Bureau of Police, Portland, Oregon, and the Alexandria, Virginia,

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Fire Department. In both units annual testing of employees has begun. In Portland the testing is being done to develop normative data for the police department, and in the Alexandria Fire Department it is being done to guarantee specified levels of fitness at the time of annual performance review. The more common practice, however, is testing upon hiring only.

In both police work and firefighting, positions appear to combine occasional demands for difficult physical performance and occasional bursts of anxiety-provoking threat with rather ordinary, non-stressful service. The jobs demand fitness but do not offer regular opportunities to practice fitness skills in the daily conduct of the job. Documentation is not available, but numerous experts in the field have commented informally that both firefighting and law enforcement are less burdensome today than 30 years ago because of shorter hours and improved equipment.

Neither group seems to have any consistent retirement policy. In 1972 the Retirement Research Committee of the State of Wisconsin conducted a study of the retirement policies and practices of the police and fire departments of the 100 largest cities in the country. Figure 1 shows the wide range in mandatory retirement ages in the police and fire departments studied by the Wisconsin committee. That wide array suggests that individual preference, and not the reason or logic, is the basis for the requirements. That is to say, since some jurisdictions find it satisfactory to allow police officers and firefighters to work until 68 or 70, and some have no mandatory retirement policy at all, there is no apparent logical reason for jurisdictions to claim that age is a bona fide occupational qualification. Tradition or political pressure might be alternative explanations.

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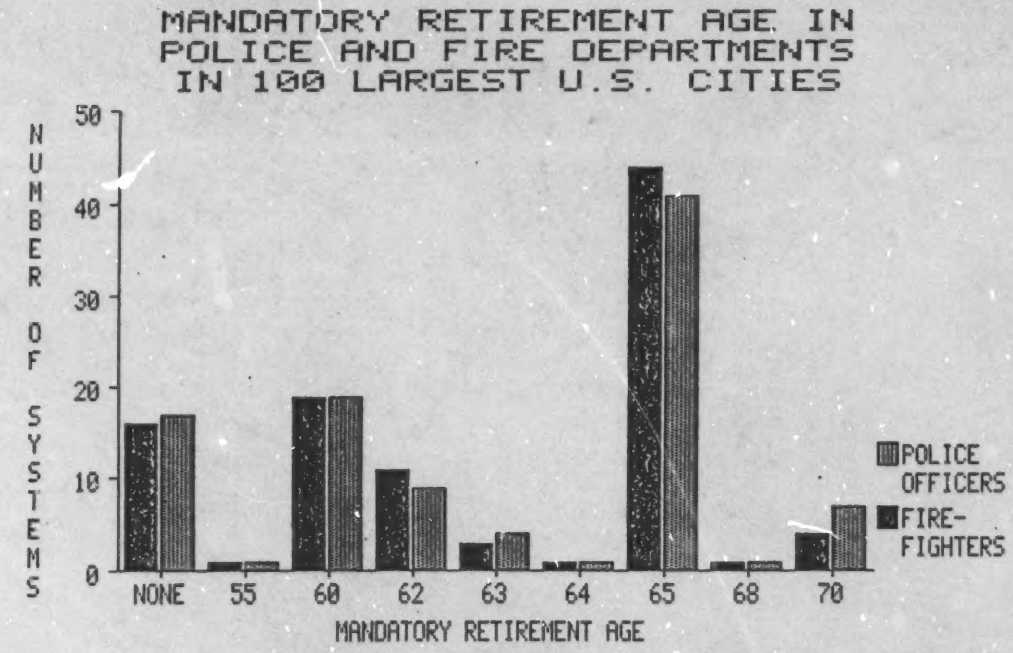
Figure 1.



SOURCE: WISCONSIN RETIREMENT RESEARCH COMMITTEE STAFF. "NATIONWIDE STUDY OF SELECTED SYSTEMS TO DETERMINE HOW PROTECTIVE OCCUPATION PARTICIPANTS UNDER THE WISCONSIN RETIREMENT FUND COMPARE WITH OTHER SYSTEMS." REPORT N. 248. NCJRS MICROFICHE, ROCKVILLE, MARYLAND.

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III. PREDICTING PERFORMANCE OF OLDER WORKERS

The use of chronological age to determine whether or not older workers are capable of continuing their work is generally based on the related assumptions that abilities decline with age, that all or nearly all workers of a given age have similar abilities, and that individuals cannot be assessed. While there is enough evidence to convince some that ability diminishes as adulthood progresses, the relationship is far from the axiom it was taken to be several years ago. The general assumption must be questioned for two reasons: (1) adult Americans are healthier now that they were two decades ago, and (2) advances in methods and substantive findings in gerontology and health sciences have rendered the assumption at best reductionistic or overly simplistic, and, in some instances, clearly wrong or at least lacking in support from empirical observations. In the first part of this section we will address these and related matters. Following that we will briefly summarize recent information on the description of jobs and the assessment of individuals.

A. Selected Health Trends

Measuring health by mortality data is conceptually unattractive in an era of growing interest in positive health; but until very recently the negative indicators of health status, death and disease statistics, were the only indicators available. And even morbidity data, which would be useful for considering issues related to the performance of workers and to workers' disability and pension funds, are virtually non-existent on a national scale. For example, although heart disease (discussed below) is the leading cause of death in the United States today, there are no national data on its incidence except for the interview data collected as part of the 1972 Health Interview Survey. When the 1971-1974 Health and Nutrition Examination Survey data become available, comparisons can be made between those data

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(based on a national probability sample of non-institutionalized adults) and the most recent prior estimates based on physical examinations, the National Health Examination Survey of 1960-1962 (Fingerhut, Wilson, and Feldman, 1980, pps. 17-18). Until then, however, any conclusions on the incidence of heart disease must be based on generalizations from very incomplete data.

During the twentieth century the mortality rate has dropped and the causes of death have shifted. At the beginning of the century, infectious diseases, especially tuberculosis, were responsible for most of the death in this country. Primarily because of non-pharmacologic public health measures such as improved sanitation and nutrition and isolation of infected persons, the death rates for nearly all infectious diseases dropped markedly over the first few decades of the century. Today tuberculosis, diptheria, measles, and smallpox have virtually been eradicated, and infectious diseases all together account for a very small proportion of deaths. After the decline of infections, we had a peak, then a decline in nutritional diseases such a pellagra. But while infectious diseases declined, mortality from chronic diseases and accidents increased. Heart diseases, cancer, stroke, and accidents have continued to be the leading causes of death up to the present (at least through 1980).

The crude death rate in the United States reached the lowest level in its history in 1979, 8.7 deaths per thousand population. The preliminary figure for 1980 is just slightly higher, 8.9. (That slight increase is partly due to the changing age structure of the population.) (National Center for Health Statistics, Sept. 17, 1981). Heart disease is the leading cause of death in this country and as such is the dominant factor in overall mortality rates. "In 1976, there were 724,000 deaths from diseases of the heart, 35 percent more than in 1950 but almost 2 percent less than in 1970. Throughout the first half of this century, the death rate for heart disease

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rose continually and peaked in the early 1960's. It has since been declining. Between 1960 and 1976, despite an aging population, the rate decreased 9 percent to 337 deaths per 100,000. During that period, the mortality rate for each 5 year age group from 25-69 years of age decreased by more than 25 percent, while for each succeeding age group through 85 years of age and over the decline was more than 19 percent" (Health United States U.S.D.H.E.W. Publication No. 78-1232, 1978, p. 169).

In order to understand population trends over time, it is important not only to note mortality rates for age groups, but also to consider age-adjusted death rates. The age-adjusted death rate shows what the level of mortality would be if no changes occurred in the age composition of the population from year to year. That is, the calculation controls for or removes the effect of age. Table 1, on the following page, gives the age adjusted rates for 1950-1977. A few figures for 1979 bring the table up to date somewhat. In that year age-adjusted death rate for all causes was 587.4; for diseases of the heart, 203.0; for malignant neoplasms, 133.4; for cerebrovascular diseases, 42.5; and for accidents, 43.6 (National Center for Health Statistics, September 17, 1981, p. 18)

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Table 1. Age-adjusted death rates[a] and average annual percentage change, according to leading causes of death in 1950: United States, selected years 1950-1977[b]

Year	All causes	Diseases of the heart	Malignant neoplasms	Cerebro-vascular disease	Accidents[c]	Tubercu-losis
			Deaths per 100,000 resident population			
1950	841.5	307.6	125.4	88.8	57.5	21.7
1955	764.6	287.5	125.8	83.0	54.4	8.4
1960	760.9	286.2	125.8	79.7	49.9	5.4
1965	739.0	273.9	127.0	72.7	53.3	3.6
1970	714.3	263.6	129.9	66.3	53.7	2.2
1975	638.3	220.5	130.9	54.5	44.8	1.2
1976	627.5	216.7	132.3	51.4	43.2	1.1
1977	612.3	210.4	133.0	48.2	43.8	1.0
			Average annual percentage change			
1950-77	-1.2	-1.4	0.2	-2.2	-1.0	-10.8
1950-55	-1.9	-1.3	0.1	-1.3	-1.1	-17.3
1955-60	-0.1	-0.1	0.0	-0.8	-1.7	-8.5
1960-65	-0.6	-0.9	0.2	-1.8	1.3	-7.8
1965-70	-0.7	-1.5	0.5	-1.8	0.1	-9.4
1970-77	-2.2	-2.6	0.3	-4.5	-2.9	-10.7
1975-77	-2.1	-2.3	0.8	-6.0	-0.5	-0.9

[a]Note: Age-adjusted rates computed by the direct method to the age distribution of the total U.S. population as enumerated in 1940, using 11 age intervals.

[b]Source: Division of Vital Statistics, National Center for Health Statistics: Selected data. Data are based on the national vital registration system.

[c]Includes motor vehicle and all other.

Source: Fingerhut, Wilson & Feldman, p. 10.

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According to Fingerhut, Wilson and Feldman, "ischemic heart disease mortality includes about 90% of all heart disease mortality, and as such, the trends are similar. Age-adjusted death rates decreased about 3% per year during the past decade. For each 5-year age group between 25 and 69 years of age, declines of at least 25% during the period from 1968 to 1977 have been noted" (1980, p. 11) These authors suggest that although there is no definitive "proof" of cause, the downturn in deaths due to heart disease appears to be due to "decreased smoking in general and in smoking of high tar and nicotine cigarettes in particular among adult males; improved management of hypertension; decreased dietary intake of saturated fats; more widespread physical activity; improved medical emergency services; and more widespread use and increased efficacy of coronary care units" (Ibid, p. 11).

The second major component of cardiovascular disease is cerebrovascular accidents or stroke -- the third leading cause of death in this country in recent years. Cerebrovascular age-adjusted mortality rates decreased about 25% from 1950-1970 to 66 deaths per 100,000 population. By 1979 the rate had decreased an additional 35.6%, to 42.5 deaths per 100,000 population. Fingerhut, Wilson and Feldman point out that the "downturn in stroke mortality probably reflects both a decrease in the incidence of stroke and in the fatality rate among stroke victims. Improved management of hypertension has been offered as an explanation of the declining incidence" (p. 11).

In summary, over the last 80 years, the mortality rate has fallen and the causes of death have shifted in the U.S. Gains in the first half of the century were largely due to measures which eradicated the most prevalent infections and which those had the greatest effect on mortality of infants; nevertheless, after a plateau of several years the mortality rate has continued to decline, at all ages. Much of that decline is due to a decline

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in cardiovascular diseases, which can be attributed to both improved health services and the assumption of healthier life styles by many Americans.

This small but quite steady decline in deaths due to cardiovascular disease is the basis for our contention that adult Americans are healthier now than they were two decades ago. It is lamentable that indicators of positive health of the population are not available, and that we do not even have reliable and recent morbidity data. While Fries (1980, 1981) points to a compression of morbidity or infirmity by later onset of chronic degenerative diseases such as heart attack, stroke, lung cancer, and emphysema, that phenomenon must remain partly speculative until we have population-based data to confirm the health of survivors.

B. Individual Differences in Aging

Aging is a process which occurs over the entire life span. The rate of aging varies between groups of people and between individuals in the same group. The rate of aging even varies within an individual because different body systems and functions do not age at the same rate. The general assumption then, that abilities decline with age, must be further specified to allow for individual variation.

Many studies have shown more variation within age groups then between age groups. Szafran (1968) for example, studied pilots in their late 20's and early 60's to examine relationships between psycho-physiologic measures, age, and performance of skills considered essential to flying. Although older pilots' physiologic status was less that that of younger pilots, the performance of older pilots was essentially comparable to that of the younger pilots. In addition, differences between individuals within age groups were greater than differences between age groups. Fries and Crapo note that although intuitively we might expect the greatest variability of a performance measure to occur at its peak, in fact, with respect to age the

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opposite is true. That is, "differences between individuals, usually represented statistically by the standard deviation from the mean, increase with advancing calendar age."

In addition to modifying the "decline of abilities assumption" to allow for multiple and substantial individual differences, a critical area of concern is the extent to which abilities decline with age and the extent to which those declines are functions of disease. Busse has written of the need to separate primary and secondary aging (primary aging refers to one interaction of an inevitable accumulation of life events one time, while secondary aging refers to consequence of disease and trauma which may occur over the life span). Others have discussed pure age effect and disease, or normative and non-normative changes. While we have not yet satisfactorily distinguished between the effects of aging and disease, and that task is indeed far from simple, we at least know that there <u>are</u> differences between normal aging and disease. Future studies must be thoughtfully designed to further clarify, not obscure, these differences. In that regard, while the omnibus studies of aging done in the past have yielded important descriptive findings about certain aspects of aging, it is time now to undertake studies with more conceptual strengths and a more deliberate focus on health as it is related to age.

Cross sectional studies have tended to obscure differences between aging and disease. Sometimes persons with relevant characteristics (such as smoking, for example) have been improperly included in studies of functional status by age. For example, Mohler (67-70, 1980) cites pulmonary function studies by Morris showing that "deleting non-smokers from the population reference group gave a decade of improvement in pulmonary function to every age bracket."

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Wilkie and Eisdorfer found that in older subjects free of hypertension, intelligence stayed the same or improved over a 10-year period (1971). The human brain, according to pathologist F. Stephen Vogel (1982), really doesn't age to any important degree; the nervous system, like a fine wine, improves with age. Brain function can be impaired by arteriosclerotic changes as well as by such diseases as Huntington's Chorea, Parkinson's Disease, Amyotrophic Lateral Sclerosis, and Alzheimer's Disease. But although certain diseases tend to appear as a person grows older, it is not always true that the brain becomes diseased with age.

Fries and Crapo (1981, pp. 111-121) argue that individual differences are far more significant than variation due to age, and many phenomena previously associated with "aging" are instead functions of diseases; moreover, they say, many attributes may in fact be strengthened or improved with age. They refer to this potential for modification of function as "plasticity." Fries and Crapo concentrate on the improvements that can take place because of a decrease in disease, or as a result of taking advantage of favorable changes or characteristics of entire cohorts, or through the personal choice of individuals. That is, within certain biological limits (life is finite), individuals can choose to slow their aging by practicing physical fitness, by practicing cognitive skills and memory, and by practicing social interaction and psychological coping skills (Though relationships are less well documented, the latter are perhaps no less important than other skills). Mohler (p. 10) cites Young, who showed (1979) that "a 10-week program of jogging, calesthenics and recreational activities gave improved scores on the WAIS Digit Symbol and Block Design tests, trail making (brain function) crossing off (speed of performance), and Associate Learning." The subjects showed an increase in health status rating and a decrease in anxiety.

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In both the health sciences and gerontology, recent investigators have benefitted from greater sophistication about what in epidemiology is called "the web of causation," and what more generally might be described as complicated interrelationships. As more and more is known about an area of health or aging, more meaningful and sometimes more subtle questions can be asked. Thus, just as race and sex no longer have the explanatory power social scientists thought in the 1950's, no longer does chronological age merit great faith as an explanatory variable by itself.

C. Additional Considerations in Assessing Workers.

In addition to the opportunities individuals have to improve their performance on several characteristics such as exercise tolerance, maximal breathing rate, cardiac reserve, reaction time physical strength, short-term memory, intelligence (but probably not elasticity of skin, rigidity of arteries, or kidney function), individuals can also benefit from the development of compensatory attributes. For example, McFarland (cited by Sheppard and Rix, 1977, p. 14) found that "compensation takes place for every decline, and if certain ones diminish, others are enhanced; while reaction speed may be low at the upper age, there is a compensatory increase in skill, judgment, and endurance." Because employers hire whole persons not only selected body systems or functions such compensatory behaviors must be taken into account if they might influence desired performance.

Shock (1977) and others have shown that many of our physiologic functions begin to decline at about age 30. Despite the pattern, however, many workers in late adult life may still have reserve capacities in excess of what is required by the job or task. The dramatic example of the marathon runner (Fries, 1980, p. 134) whose performance declines linearly between ages 30 and 70 is a case in point. Compared to other marathon runners, the 40-year old who runs the race in 3-1/2 hours is slow. Compared

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to others in his age group (and younger), who would be expected to require 48 hours or more to go the 26 mile distance on foot, our 40 year old marathon runner performs very well indeed. Fries contends that practice more than age shapes such performance.

While we know that working people generally are more fit than the adult population as a whole, unfortunately we have no systematic population-based evidence of the health status of working people. There is fragmentary evidence, however, that at least indirectly attests to the fitness of older workers. For example, in Robert W. Johson et al. vs the Mayor and City Council of Baltimore the plaintiff(s) sued for the right to continue working as firemen and not be mandatorily retired at the age of 60. For more than a year after their 60th birthdays plaintiffs were allowed to work -- until the case was heard in court. During that time the plaintiffs performed arduous firefighting duties satisfactorily according to the trial record cited by the presiding judge, Judge Alexander Harvey II, Federal District Court for the District of Maryland, June 9, 1981, Civil No. H-79-998. The Judge observed that "historically Baltimore firemen have always worked past 60 and even up to age 70...this continued employment of firefighters beyond the age of 60 has in no way affected the high caliber of services performed by the Baltimore City Fire Department."

Furthermore, since it is a biological axiom that any single biological variable is the best predictor of that variable (for that person) in the future, it is perplexing that group norms are used as standards for judging fitness to continue work rather than the prior values of a particular worker.

All these considerations are important for assessing the ability of older workers to perform tasks. Finally, for an assessment of older workers it is essential not only to show the relevance of particular characteristics

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to the job or task, but also to specify what levels of capability are needed for performing the job.

D. The Description of Jobs and Assessment of Individuals

In addition to difficulties with chronological age as a predictor of work performance, any discussion of the issues to be considered in one assessment of older workers must include, as a minimum, how jobs are described and how individuals can be assessed. In this section we will discuss job analysis, performance appraisal, and how the two might fit together.

"Job analysis is the process of determining the characteristics of an area of work according to a prescribed set of dimensions..." The end product of the analysis is "a set of data which can be interpreted according to some prescribed classification matrix" (Sparks, 1982, p. 1). Job analysis is more specific than job description (which is a general statement of job duties and responsibilities). Reviews of the topic begin with Uhrbrock (1922); include "classics" by Fine (1965), Flanagan (1954), Fleishman (1964), Ghiselli (1966); Hemphill (1959, 1960), Lawshe (1955), Prien and Ronan (1971), and Ward & Hook (1963); and are synthesized and updated by Sparks (1982), whose work is currently considered the best treatment of job analysis. A deluge of papers on the topic have appeared in the last few years, following publication of the Uniform Guidelines on Employee Selection Procedures (1978). In this paper our interest is in the relevance of job analysis to employee assessment, with particular reference to older workers. We will, therefore, merely present key studies with a brief description of how job analysis is done and a little more detail about a few important strategies. Our work was greatly aided by conversations with Sparks (June, 1981), Fleishman (July 2, 1981), Fine (July 2, 1981), and Flanagan (July 25, 1981).

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There is no standard procedure for performing a job analysis. All job analysis techniques begin with a set of descriptors which are applied to the job or to the worker -- for example, number of persons supervised, or physical demands reflecting need for strength or agility. In nearly all job analyses descriptors depend on lists of tasks performed or behaviors demonstrated.

Collecting descriptor data is the first step in job analysis. Methods of data collection vary; they may include observation of the worker working; interview with the worker; questionnaire, either unstructured or structured; and diary. Descriptor data may be collected by trained job analysts, or job incumbents, or supervisors. The accumulated data are then brought together in some summary fashion, and organized according to some structure.

Research-based systems of job analysis vary greatly; techniques include the Position Analysis Questionnaire (PAQ), developed by Ernest J. McCormick and his associates at Purdue (McCormick, Jeanneret and Mecham, 1972); the Occupation Analysis Inventory (OAI) of Cunningham, Phillips, and Spetz (1976) of North Carolina State University in Raleigh; and the Job Element Method developed by Ernest S. Primoff (1971) of the U.S. Civil Service Commission; Physical Abilities Analysis (PAA) of Edwin A. Fleishman (1964, 1975, 1979); and the Functional Job Analysis (FJA) developed by Sidney A. Fine (1973). Here we will discuss the concepts underlying Fleishman's PAA and of Fine's FJA. Descriptions of the other methods mentioned above appear in Appendix C.

The notion that there is a functional organization of skills is central to the work of both Fleishman and Fine.

Fleishman (1962, 1975) distinguishes between ability and skill, observing that ability refers to a more general capacity of the individual related to performance in a number of tasks, while the term skill is task

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oriented and refers to the level of proficiency on a specific task or limited group of tasks. For example, the ability "spatial visualization has been found related to performance on such diverse tasks as aerial navigation, blueprint reading; and dentistry..." (1975, p. 1131).

According to Fleishman, when people "talk about proficiency of operating a turret lathe or in flying an airplane or in playing basketball," they are talking about specific skills. Fleishman assumes that the skills involved in complex activities such as jobs can be described in terms of more basic abilities; for example, "the level of performance a man can attain on a turret lathe may depend on his basic abilities of manual dexterity and motor coordination, and those same basic abilities may be important to proficiency in other skills as well. Thus, manual dexterity is also needed in assembling electrical components and motor coordination is needed to fly an airplane" (Fleishman, 1979, p. 83). Fleishman thus establishes that predictions and generalizations about human performance may be made across jobs without studying each empirically. That is a very important shortcut, backed by rigorous experimental and correlational research.

Fine's Functional Job Analysis complements Fleishman's work on generic physical abilities (Fine and Wiley, 1971; Fine, 1973). The FJA consists primarily of scales for three classifications: "data," "people," and "things." Each of those three scales includes a hierarchical list of behaviors, from a low level (such as "comparing") to a high level (such as "synthesizing").

Performance appraisal techniques are no more uniform than job analysis methods. Walker and Lupton (1979) note the great variation in appraisal strategies, but suggest that is is "the manner of design and implementation that determines effectiveness of an appraisal program more than it is the

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particular set of techniques adopted." They offer the following guidelines for designing and implementing performance appraisal programs:

1) Apply specific performance standards. To be job related and free of age bias, performance evaluations need to be based on specific empirically derived job requirements.

2) Assure that the program is rationally designed. The system [must be] designed for specific purposes, which are reasonable and clearly identified, and...the techniques adopted [must] have the capacity to achieve these objectives.

3) Document performance evaluations. Written evaluations provide a company with a record of judgments underlying personnel actions.

4) Administer the program systematically. Maintain a regular schedule for evaluations.

5) Train the appraisers. Training should cover the administrative aspects of a program..[and] it should also help appraisers understand the objectives, problems and behavioral aspects of performance evaluation. (Walker and Lupton, 1978, p. 79)

Sparks (1982, p. 3) emphasizes the point: "Performance appraisal should be based on the demands of the job, not on personality traits or characteristics unless these are demonstrably job-related. A performance appraisal tied directly to the job analysis is the best assurance of job-relatedness."

Measurement of health status, either comprehensively or partially, may be a type of performance appraisal for some jobs. Assessment of physical fitness may be required.

In general, when health or fitness assessment is required it is for the purpose of increasing the probability of competent performance of the job and decreasing the probability of injury or unnecessary disease for the worker. Fitness in the performance sense is not necessarily, however, the same as general health. Studies by such people as exercise physiologist Paul Davis (Davis and Starck, 1980), cardiologist Robert Bruce (Bruce et al., 1974; Bruce and DeRouen, 1978; Bruce, DeRouen, and Hossack, 1980), and epidemiologist Paffenbarger (1978) have helped to clarify the relations

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between performance capacities, specific physiologic indices, and health. Measurements of health status and of physical fitness are substantial topics. Here we will only note a few guiding principles which tie the area to considerations involved in predicting the performance of older workers.

Health and physical fitness can be measured in several ways: physical examination, laboratory and diagnostic procedures, rating scales filled out by an examiner, archival data, interview, and self-report. Each technique has advantages and disadvantages, and for each, there are obvious questions about what should be measured and what results are acceptable. Great advances have been made in the measurement of health status and fitness. For example, in 1959, a resting ECG was an appropriate test for cardiac endurance. By 1981, however, when the Institute of Medicine Committee studied mandatory retirement of commercial airline pilots, it was acknowledged by the committee that use of resting ECG had been outmoded (for the purpose intended) for some time and instead a stress ECG was required (Institute of Medicine, 1981).

For any systematic measurement, whether job analysis, performance appraisal, or other tests such as physical examination, measurement issues such as reliability, validity and comprehensiveness, as well as feasibility, must be considered. Reliability refers to consistency in measurement. Some of the approaches to reliability include test-retest, inter-observer, and internal consistency. The nature of the measurements must be kept in mind when choosing approaches to reliability. Validity refers to how well something measures what if purports to measure. There are several approaches to validity; easier methods, such as demonstrating face validity, tend to have less meaning than more difficult strategies, such as criterion validity. Comprehensiveness refers to how much of the relevant information is assessed by a measure: an instrument to measure grip strength in a

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fireman may be highly reliable and valid as a measure of static strength, but lacking in comprehensiveness as a measure of overall strength.

Feasibility of the measures selected must always be kept in mind. Feasibility refers to acceptability to those who assess and those who are assessed. It involves consideration of time, financial resources, and how well understood and found useful, necessary and fair measures are.

All these issues are important, and they are not always easy to deal with. A further difficulty is that there are no absolute levels of acceptability for any of them. The purpose of the measurement and its consequences help people determine acceptable levels of reliability, validity, etc.

As the discussion above indicates, the choice of health status or fitness measures for either entry selection or continuation in a job must be tied to job analysis. Although we have accumulated considerable experience with job analysis and performance appraisal, including evaluation of health and/or fitness, there is limited experience and great potential in putting those activities together meaningfully. To conclude this section we will present on a framework for combining job analysis and performance appraisal and refer to a few examples that have relevance for police officers and firefighters.

Avolio and Panek (1981, pp. 6-7) suggest the following steps in pulling together job analysis and performance appraisal, especially when age is a concern:

1) Conduct a job analysis to identify relevant job components.
2) Identify those attributes relevant to each specific job component.
3) Specify those abilities relevant to job performance that vary with increasing age.
4) Design a validation project considering the potential variations on performance capacity for all attributes.

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5) Obtain validity estimates for your predictor battery. Develop your predictor battery and criterion considering only the essential components of the job. Try to minimize irrelevant factors which may interact with the aging process and your estimate of validity.

6) Determine cut-off levels for your predictor battery while assessing the differential impact across age groups.

7) Design expectancy charts to convey the probability for successful performance given individual performance scores.

8) Continue to accumulate data to assess the efficacy of your selection strategy over an extended period of time. Also, the repeated evaluations will allow for the tracking of individual performance levels from one assessment period to the next period.

Avolio and Panek (1981, pp. 7-8) go on to discuss the generation of expectancy tables:

> Expectancy tables reflect test scores relative to the probability of success associated with specific performance on a criterion task. Using this analysis we can establish criterion performance levels beyond which individuals could be expected to perform the job at a satisfactory level. With this approach companies and/or the courts could require an individual to be tested more frequently on those functions which are essential for job performance. With repeated assessments one can track an individual's performance level over time, to determine whether substantial drops in their expected probability of successful performance have occurred. The key to this approach is the transformation of correlation coefficients between predictor and criterion scores into probability estimates.

Avolio and Panek (1981, p. 9) present their procedure in a model called "A Framework for Older Worker Assessment," which appears on the following page:

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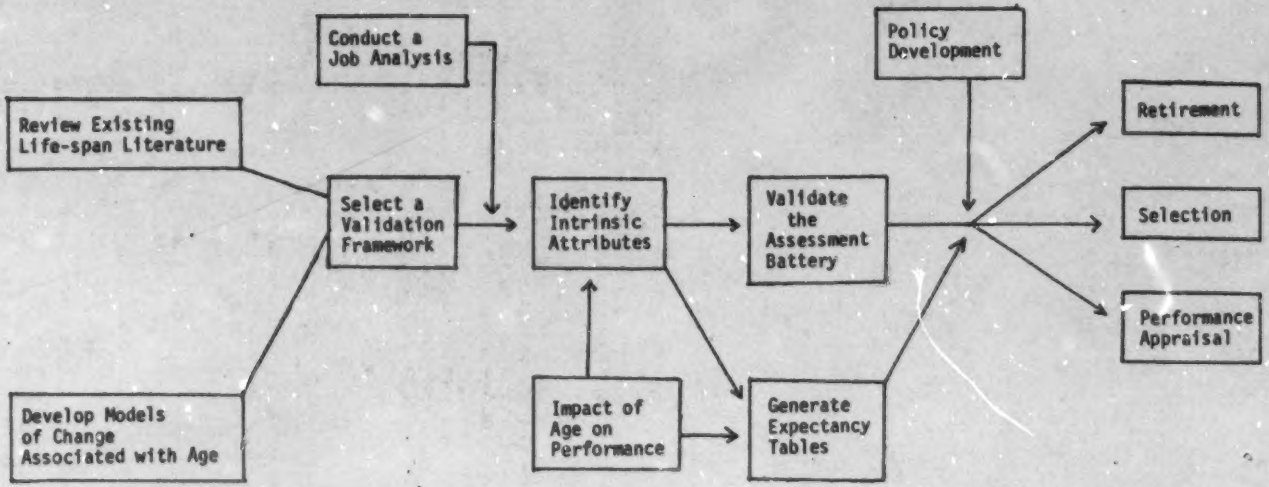
Figure 2

A Framework for Older Worker Assessment



(Source: Avolfo and Panek)

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The work of Avolio and Panek and their colleague Harvey Sterns has much potential for future endeavors in this area. Lest small employers be discouraged by their rather elaborate procedure, we should observe that even small employers can use job analysis to show job comparability and use measures validated elsewhere.

Finally, before giving examples of performance appraisal based on job analysis, a note about the utilization of medical data in performance appraisal, or more specifically, the assumption of responsibility for using medical data in decision making. Traditional medical approaches to risk tend to rely on dramatization of "the worst possible case," rather than on the probabilistic approaches which might be more commonly employed by managers with an economics background. Physicians participating in performance appraisals should therefore be encouraged to be information givers, not decision makers. Management sets limits for job performance and must decide what is an acceptable level of risk. Fleishman (Personal communication, 7/2/81) believes it would be helpful for physicians to better understand job requirements; others go beyond that to suggest that if physicians understood the entire area of job analysis and performance appraisal they might be more comfortable functioning as information givers and not bearing responsibility for the consequences of risk. However, because of the great respect in which physicians have traditionally been held, this shift in responsibility may require some adjustment by physicians and managers alike.

A few examples of performance appraisal based on job analysis will conclude this section. A training guide for physical demands analysis demonstrating the use of Koyl's GULHEMP method has been published by the National Council on the Aging (Nelson, 1973). The Koyl method, designed for industrial organizations with an inplant medical facility requires a

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physician to determine physical abilities of the individual and a job analyst to assess the job's physical demands. The acronym GULHEMP stands for general physique, upper extremities, lower extremities, hearing, eyesight, mentality, and personality. While this strategy is valuable historically, and is predicated on evaluating the job and the worker, it seems less desirable today than more recent rigorous empirically-based work (e.g., Fleishman).

Jones and Prien (1978) report a procedure to test physical abilities of job applicants (see Appendix, Section D) based on Fleishman's P.A.A. and Criterion validity is shown by "blind" observations of job performance. While the occupational group studied is not specified, it could easily be police officers or firefighters.

In Alexandria, Virginia, the Fire Department has a performance appraisal program which is based on the job analysis reported earlier by Dotson, Santa Maria, Davis, and Schwartz (1978). All uniformed workers hired after November, 1979, agree to participate in both the annual performance appraisal and the contributory weekly physical fitness maintenance program. Officers are given an hour a week for directed exercise. While it is too early to draw inferences about the annual data that are accumulating, management believes that the program will allow officers to perform their work better, to pass required tests for the job much later in life than otherwise, and because of better health, to cost the city less money in "payouts" for disability. The program in Alexandria is being used as a guide for numerous others across the country (Personal Communication, Beam, 1982) and has great potential as a method of promoting the employment of persons based on ability rather than age.

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IV. CONCLUSIONS AND IMPLICATIONS

This report, written by a gerontologist with training in epidemiology and experience in the areas of work and health, is based on the author's interviews with experts in the fields of job analysis, performance appraisal, firefighting, and police work. It also depends heavily on review of published and unpublished literature. Although more time and additional perspectives would have strengthened the report, we are ready to state the following conclusions on the basis of the information presented in earlier sections:

1. Older Americans are healthier today than 20 years ago. Mortality rates for adults have declined, primarily in the area of cardiovascular disease.
2. Declines in performance previously thought to be both age related and inevitable are now in many instances known to be functions not of aging, but of disease - and they are therefore not inevitable.
3. There are measures available for assessing the performance of police officers and firefighters; these tests are job related, feasible, and have reliability and validity reported. Such measures should be used for selection retention, and retirement decisions, with information on individuals accumulated over time.
4. There is no apparent reason for the continuation of mandatory retirement for healthy, motivated and competent police officers.
5. For firefighters, the combination of sedentary activity with intermittent demands for bursts of strength, with added threats of time urgency and extreme temperatures, appears to place the workers and those they serve at somewhat greater risk than police. Systematic fitness programs based on job analysis, with fire-

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fighters' performance tracked over time, are already in effect and may soon provide evidence that will support abolition of mandatory retirement for firefighters.

6. More research on work is needed, particularly longitudinal studies which will illuminate the way the work environment affects health and well-being, and the way individuals adapt to this environment.
7. Emphasis on health promotion is needed among working people. If management concerns about allowing police and firefighters to work are even partially related to the incidence of cardiovascular disease leading to disability benefits, then for that reason as well as for the sake of maintenance of performance and provision of high quality services, there must be systematic emphasis on health promotion throughout the work career - primarily promotion of physical fitness, but also promotion of healthy life style (no smoking, stress management, etc.).

This report has important implications for employees, employers, attorneys, members of Congress, and researchers.

For Employees:

Increasing numbers of complaints of age discrimination in employment have been filed, investigated, brought to court, and won in recent years. Healthy older people who want the opportunity to demonstrate that they can work effectively and safely are showing less and less tolerance of mandatory retirement. Police officers who wish to see an end to mandatory retirement will be directly helped by this report. A careful reading of the report will ultimately increase work opportunities for older firefighters as well, because the use of objective performance appraisals based on valid, re-

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liable, and feasible job analysis and health/performance maintenance programs will help older firefighters continue to perform their work efficiently and safely. This report and the recommendations of the NIA Panel on Commercial Airline Pilots should serve as a basis for a similar study of bus drivers. Other workers over the age of 40 may benefit from reports such as this by being generally less subject to overs or subtle discrimination.

For Employers:

Employers stand to benefit from this report because it offers them general guidelines for establishing meaningful, job related performance appraisals to strengthen selection, continuation, promotion, and termination procedures. Strengthening these procedures has the potential for enabling employees to work longer and in better health and thus has the potential for saving money that might otherwise be spent on disability and pension funds.

For Attorneys:

Attorneys involved in litigation of age discrimination in employment cases may find the report useful both as background and as a source of references.

For Members of Congress:

Legislators should view the report as a rudimentary state of the act assessment of health and performance issues related to workers presently not protected by the 1978 Amendments to the ADEA. Its chief benefit in that respect is its comprehensive approach -- an important factor in consideration of the government's obligation to protect the balance between individual and public rights with regard to age, employment, competence, retirement and well-being.

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For Researchers:

Investigators may find the report a stimulus for generating a variety of hypotheses to be tested and useful in the development of theory related to competence and roles.

Additional research is needed on the unique and separate effects of primary and secondary aging processes on the work performance of adults and on the effects of public employment policies and private corporate policies and practices on individual workers, population groups, and society. (Questions about relationships between work and age might simply address quality of work over time in occupations for which age has continued to be viewed as an occupational qualification, but questions must also be sufficiently complex to reflect subtle and intermingled human and environmental factors.)

In addition, longitudinal and/or cross-sequential studies are needed for comparing differences of workers at different ages without the limitations of cohort differences or experiences peculiar to particular generations. In addition, much information can be gained through either secondary analyses of existing longitudinal studies or through enlargement of new studies whose major focus is something other than work or workers.

At best policy decisions and practices rely only partly on scientific findings. Many factors such as pressure from younger workers, people who are comfortable with the status quo, and those who are frankly prejudiced against older people, influence policy and practices. But scientific findings can offer a beginning, however meager, amongst the other forces, for those who understand the inequity in the present system and wish to work toward improvement for both individuals who benefit more from activity than inactivity; and for society, which needs maximum feasible productive employment of adults.

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V. APPENDIX

A. Selection of Patrol (Police) Officers

B. Firefighter Selection

C. Brief Description of Selected Job Analysis Systems

D. Testing the Physical Abilities of Job Applicants

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A. SELECTION OF POLICE PATROL OFFICERS

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Appendix A

Abilities Judged as Those to Be Assessed in Selecting Patrol Officers

Written Communication Abilities:

- Ability to write concise, understandable sentences.
- Ability to write legibly.
- Ability to express in writing what has been observed or heard personally.
- Ability to express in writing what has been related by another person.
- Ability to copy information from one source to another (copy driver's license number on citation, transcribe information from one report to another, etc.)
- Ability to depict an object or event in a drawing or in schematic from (draw depiction of accident scene, draw map for citizen, etc.)

Oral Communication Abilities:

- Ability to understand spoken messages.
- Ability to express thoughts orally in a clear, understandable manner.
- Ability to explain complicated information in simple language.
- Ability to extract important information during oral communications (listening ability).
- Ability to project one's voice clearly

Mathematical Abilities:

- Ability to add and subtract.
- Ability to multiply and divide.
- Ability to work with fractions, decimals or percentages.

Information Processing and Problem-Solving Abilities:

- Ability to plan an appropriate course of action to reach an objective.
- Ability to make sound decisions "on the spot."
- Ability to recognize specific signs or symptoms that indicate a larger or broader problem or situation.
- Ability to compare information from several sources for similarities and differences.
- Ability to develop alternative explanations or causes for situations or events.

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Factual Recall Abilities:

Ability to recall factual information (for example, laws, suspects' descriptions, license numbers, etc.).

Ability to remember visual information (photograph, pictorial display, building layout, map, etc.).

Ability to remember specific details of a past event (accident, arrest, condition of building, etc.).

Learning Ability:

Ability to learn new information quickly.

Ability to perform a learned complex series of movements rapidly in the proper sequence.

In addition, a number of personal characteristics were determined to be essential to successful performance, and appropriate for consideration in pre-employment screening procedures.

Personal Characteristics Judged as Those to Be Assessed in Selecting Patrol Officers

Willingness to Perform Despite Danger or Discomfort:

Willingness to expose self to physical danger.

Willingness to perform despite physical discomfort.

Assertiveness or Aggressiveness:

Willingness to use physical force against others.

Extroversion (outgoing, enthusiastic, willingness to deal with strangers).

Willingness to be assertive and aggressive.

Willingness to challenge people who are behaving suspiciously.

Cooperativeness, Lack of Prejudice:

Willingness to work in cooperation with others.

Openness to different types of people.

Willingness to view people objectively without prejudice.

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Decisiveness, Acceptance of Responsibility:
- Willingness to accept responsibility for own actions.
- Tendency to seek responsibility.
- Willingness to make decisions without specific instructions.

Interest in Learning and Self-Development:
- Willingness to improve self.
- Interest in learning new skills or acquiring new information.

Honesty and Integrity

Interest in Police Work

Dependability

Emotional Stability, Tolerance of Stress:
- Tendency for evenness of mood, optimism and cheerfulness, rather than fluctuations in mood and pessimism.
- Ability to perform effectively under emotional stress.

Finally, several physical attributes were determined to be relevant for consideration in pre-employment screening.

Physical Attributes Judged as Those To Be Assessed in Selecting Patrol Officers

Demonstration of Weight in Proportion to Height According to Accepted Medical Standards.

Hearing Acuity:
- Ability to recognize differences in sound patterns (auto engine sounds, voice differences, different caliber firearm discharges, etc.).
- Ability to judge distance between self and objects, or between objects (depth perception).

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Color and Depth Perception:

Ability to identify and distinguish colors.

Ability to judge distances between self and objects, or between objects (depth perception).

Strength and Conditioning:

Ability to coordinate movement of hands and arms.

Ability to coordinate the movement of limbs based on visual input.

Ability to maintain body balance in unusual contexts (climbing, crawling, crossing barriers, etc.).

Source: Selecting Police Officers, Developing Job-Related Selection Standards for Twin Cities Area Suburban Police Departments. A Joint Study of the Metropolitan Area Management Association and the Metropolitan Council, April 1980. Metropolitan Council 300 Metro Square Building, 7th and Robert Streets, St. Paul, Minnesota 55101.

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B. CRITERION-RELATED VALIDITY RESEARCH BASE FOR THE D.C. FIREFIGHTER SELECTION TEST

Paul van Rijn

and

Sandra S. Payne

Office of Personnel Management

Personnel Research and Development Center

Examination Services Branch

Washington, D.C.

Personnel Research Report 80-28

October 1980

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Entry Level Firefighter Tasks

Final Task List Describing the Most Critical, Time-consuming and Difficult Aspects of the Entry Level Firefighter Job

A	1	Turn Out.
A	2	Slide pole.
A	3	Don protective clothing.
A	4	Man apparatus.
A	5	Operate entrance doors.
*A	6	Select shortest route to the scene, using information regarding temporary route obstructions.
*A	7	Drive apparatus to and from scene.
*A	8	Operate tiller.
*A	9	Operate two-way radio in apparatus.
*A	11	Assist driver in maneuvering apparatus in close clearances.
*A	12	Place apparatus and equipment.
*A	13	Make apparatus ready to drive.
*B	7	Understand and follow spoken orders.
*B	8	Respond to orders given with visual signals.
*B	10	Size up.
*B	11	Locate fire.
*B	12	Relay fire conditions, life hazards and exposures to Officer-in-Charge.
*B	16	Examine fire structures for any signs of fire extension.
*B	17	Cut off fire extension.
*B	18	Determine stability of supporting surfaces, e.g., roof, floor, wall.
*B	19	Determine if your position is safe.
*B	22	Determine safest evaluation route of occupants.
*B	23	Observe and respond to changes in conditions of fire while fighting it.
*R	24	Control traffic at the scene.

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Task List (Continued)

*B 26 Control distaught persons.

*B 30 Reset fire alarm boxes.

*C 1 Notify occupants to vacate premises.

*C 3 Perform search operations.

*C 4 Remove persons from entrapments in buildings.

*C 5 Lead persons from hazardous situations.

*C 6 Carry persons via ladders and/or stairs.

*C 8 Make forcible entries.

*C 9 Recognize conditions that may lead to back-draft.

*C 10 Make openings for ventilation.

*C 11 Place fans for ventilation.

C 12 Provide portable generating equipment.

*C 13 Set up and operate lighting equipment.

*C 14 Locate shut off on public utilities.

*C 15 Shut off or control public service utilities.

*C 16 Determine type and size of ladders required.

*C 17 Stabalize ladder truck.

*C 18 Position and raise aerial ladders or platform using hydraulic power.

*C 22 Maneuver, raise and lower portable ladders.

*C 26 Climb or descend ladders carrying equipment.

C 27 Climb or descend ladders without carrying equipment.

*D 1 Estimate lengths of hose needed.

*D 2 Lay single line of hose.

*D 3 Lay multiple lines of hose.

*D 4 Lay split lines of hose.

D 5 Carry or drag hose lines.

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Task List (Continued)

*D	6	Hoist hose lines.
*D	9	Extend or reduce hose lines.
*D	10	Operate playpipe equipment.
D	11	Roll or fold hose.
*D	12	Load hose on apparatus.
*D	13	Operate off booster tanks.
D	15	Operate hydrant.
*D	17	Connect to standpipe system.
*D	18	Supply or supplement standpipe or sprinkler system.
*D	20	Operate line from heights e.g., rooftop or ladder.
*D	21	Operate in confined space.
*D	22	Operate light water equipment.
*D	24	Read and interpret gauges or meters.
*D	25	Prime pumps.
*D	27	Calculate water pressure in pounds per square inch.
*D	28	Calculate discharge in gallons per minute.
*D	29	Calculate pumper engine pressure.
*D	30	Calculate friction loss allowances.
*D	36	Select alternative tools when designated tools or equipment are not available.
*D	37	Don and use mask.
*D	38	Tie appropriate rope knots.
*D	39	Use hand tools.
*E	1	Protect FD and civilian property from damage, e.g., place salvage covers, remove objects from danger.
*E	4	Remove excess water using devices other than portable pumps and siphons.
E	7	Remove debris.
*F	8	Safeguard against rekindles.

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Task List (Continued)

*E 9 Eliminate unsafe conditions resulting from emergency.

*E 10 Cover openings e.g., roof, windows, floors.

*E 16 Reset alarm systems (or insure that this is done).

*E 17 Inventory FD equipment before leaving the scene.

*F 1 Locate and dig to free victims in tunnels, pipes excavations, etc.

*F 2 Move heavy objects or materials to gain access to or free victims.

*F 3 Perform water or ice rescues, using appropriate tools or equipment.

*F 5 Rescue from transportation accidents.

*F 7 Extricate victims from high places.

*F 8 Rescue from electrical contact.

*F 9 Rescue from hazardous area (chemical, gaseous, etc.).

*F 10 Free victims from machinery.

*F 16 Handle flammable or hazardous materials.

*F 17 Remove hazardous materials or blockages from roadways.

G 1 Clean and polish tools, equipment and apparatus.

*G 2 Test and maintain communication systems at the station house.

*G 3 Test and maintain apparatus, including pumps.

*G 4 Inspect and maintain hose and coupling.

*G 5 Test fire hose.

*G 6 Inspect and maintain tools.

*G 7 Inspect and maintain rescue equipment.

*G 8 Inspect, replenish and maintain first aid equipment.

*G 10 Inspect and maintain ropes.

*G 11 Inspect and maintain lighting equipment.

*G 12 Inspect and maintain safety and protective equipment.

G 13 Maintain personal fire fighting equipment in readiness.

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Task List (Continued)

*G 14 Replenish compressed air tanks.

*G 15 Inspect extinguishers on apparatus.

*G 16 Maintain inventory of tools and equipment.

*G 18 Make minor repairs to equipment and tools.

*H 1 Examine victim and diagnose symptoms.

*H 4 Determine when a victim should be moved.

*H 5 Operate first aid equipment.

*H 6 Stop or control bleeding.

*H 7 Clean wounds and apply dressings and bandages.

*H 8 Perform cardiopulmonary resuscitation.

*H 11 Treat victims of burns.

*H 12 Treat victims of heart trouble.

*H 13 Treat victims of shock.

*H 14 Treat victims of drowning.

*H 17 Treat victims for poisoning.

*H 18 Treat victims for injuries to bones, joints and muscles.

*H 21 Determine priorities for treatment.

*H 22 Treat for multiple injuries.

*H 23 Dislodge foreign objects from throats.

*H 26 Handle and lift injured persons.

*I 2 Inspect structures for fire hazards.

*J 12 Take tests

*J 14 Read and study basic firefighting manuals.

*J 15 Read and study advanced and technical firefighting manuals, e.g., NFPA Handbook, firefighting journals.

*J 16 Study basic laws and regulations pertaining to firefighting.

*J 18 Learn and perform drill evolutions.

106 BEST COPY

Task List (Continued)

*J 20	Study the use of special equipment or apparatus.
*J 21	Learn effects of special adverse conditions on the firefighting operations.
*J 23	Learn meanings of all alarm signals.
*J 24	Learn fireground operations.
*J 25	Learn fireground formulas.
*J 26	Learn district.
*J 27	Learn location and purposes of all equipment.
*J 28	Learn the structural components of buildings.
*J 30	Learn and practice procedures for special emergencies, e.g., chlorine leaks, cave-ins, subways.
*J 31	Keep up to date on pertinent information related to firefighting.
*J 37	Practice firefighting operations with full firefighting clothing and equipment.
*J 38	Practice procedures individually or in small groups to acquire or maintain proficiency.
J 45	Engage in physical fitness activities.
*K 1	Interact informally with other members of the shift.
*K 2	Communicate with other shifts to give or receive pertinent information.
K 25	Maintain proper attire.
K 26	Report and prepare for duty.
*K 45	Write entries in company journal.
*K 46	Stand watch.
*K 47	Monitor conditions affecting firehouse zone of response.
*K 48	Keep Officer-in-Charge informed of any conditions requiring his attention e.g., weather conditions.
*K 49	Receive and acknowledge Department officers.
*K 50	Receive and record alarms.
*K 52	Notify units of alarm, its location and any conditions reported.
K 57	Safeguard rD property.
*K 58	Relay orders from officers to other firefighters.

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Task List (Continued)

*K 59 Answer routine telephone calls.

*K 63 Clean and maintain quarters.

*K 67 Maintain station grounds.

*L 13 Inspect bicycles, issue tags, and collect license fee.

*L 21 Assist visitors who seek help to obtain it.

Note: The task number given at the left of each task statement refers to the task's original position in the complete task inventory, where tasks were clustered into duties identified by the letters A through L, and where tasks were numbered according to their position in each duty. The duty titles were:

Duty A - Responding to Alarms
Duty B - Performing General Firefighting Operations
Duty C - Performing Ladder Truck and Related Operations
Duty D - Performing Fire Extinguishing and Related Operations
Duty E - Performing Salvage and Overhaul Operations
Duty F - Performing Special Emergency Operations
Duty G - Maintaining Apparatus and Equipment
Duty H - Providing First Aid and Assistance
Duty I - Inspecting, Investigating, and Code Enforcing Activities
Duty J - Training
Duty K - General Management, Administration, Housewatch, and Related Activities
Duty L - Performing Public Relations and Community Activities

*Identifies the tasks which were shown in the task-ability linkage to require cognitive abilities for successful performance.

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C. BRIEF DESCRIPTIONS OF SELECTED JOB ANALYSIS SYSTEMS

From C. Paul Sparks' "Job Analysis," in K.M. Rowland and G.R. Ferris (Eds.) Personnel Management: New Perspectives. Boston: Allyn & Bacon, In Press (1982)

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Standardized Instruments

One technique for structuring job information is to use a standardized instrument and analyze it in different ways. Two such instruments stand out as having a substantial research base. One is the Position Analysis Questionnaire (PAQ) developed by Ernest J. McCormick and his associates at the Occupational Research Center, Department of Psychological Services, Purdue University, West Lafayette, Indiana (McCormick, Jeanneret, & Mecham, 1972). The other is the Occupation Analysis Inventory (OAI) developed by Joseph W. Cunningham and his associates at the Center for Occupational Education, North Carolina State University, Raleigh, North Carolina (Pass & Cunningham, 1977).

Position Analysis Questionnaire (PAQ). The PAQ is a structured job analysis questionnaire containing 187 job elements. These elements are worker-oriented in nature (See p. 4) and so might be characterized as behavior statements. McCormick (1979) describes the PAQ as organized in six divisions and gives examples of two job elements from each division:

1. Information input. (Where and how does the worker get the information he uses in performing his job?)

   Examples: Use of written materials
   Near-visual differentiation

2. Mental process. (What reasoning, decision-making, planning, and information-processing activities are involved in performing the job?)

   Examples: Level of reasoning in problem solving
   Coding/decoding

3. Work output. (What physical activities does the worker perform and what tools or devices does he use?)

   Examples: Use of keyboard devices
   Assembling/disassembling

4. Relationships with other persons. (What relationships with other people are required in performing the job?)

   Examples: Instructing
   Contacts with public, customers

5. Job context. (In what physical or social contexts is the work performed?)

   Examples: High temperature
   Interpersonal conflict situations

6. Other job characteristics. (What activities, conditions, or characteristics other than those described above are relevant to the job?)

   Examples: Specified work pace
   Amount of job structure

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Each job element is rated on one of six different types of rating scales. These scales by type are: Extent of Use; Importance to the Job; Amount of Time; Possibility of Occurrence; Applicability, and a Special Code (used in the case of a few specific job elements). Each scale, except for Applicability which is dichotomous, has five steps ranging from some version of very low to some version of very high plus a provision for rating that the element does not apply to the job being related. In addition to the 187 standard elements the PAQ contains seven items relating to amount of pay/income which are optional and are used for research purposes only.

The PAQ is scored on a number of basic job dimensions which have been derived through factor analysis. Results provide a quantitative profile for the job analyzed. In addition McCormick and his associates have used the PAQ to derive job related aptitude requirements for determining job related selection tests (McCormick, DeNisi, & Shaw, 1979; McCormick & Mecham, 1970) and job evaluation points for determining pay scales and job classifications (Robinson, Wahlstron, & Mecham, 1974). PAQ Services, Inc. has recently been formed to provide data processing services and conduct further research.

The PAQ has been a favorite with job analysis researchers who have not been directly associated with McCormick. Its structure lends itself readily to many types of study, both applied and theoretical. For example, Taylor et al (Taylor, 1978; Taylor & Colbert, 1978, and Colbert & Taylor, 1978) used the standard PAQ dimensions to develop job families, then used the same dimensions to develop empirically another set of job families, and, finally, used these empirically developed job families as the foundation for a validity generalization study of selection tests. Arvey and Mossholder (1977) used the PAQ in development of an analysis of variance procedure for determining similarities and differences among jobs.

Occupation Analysis Inventory (OAI). The OAI started from a somewhat different orientation than that of the PAQ. Cunningham et al were interested in the possibility of occupational clustering for the development of occupational education programs. However, there appears to be no reason why the OAI cannot be used for other purposes. It has been used as the report title indicates to estimate "the human ability requirements of job classifications in a state competitive service system" (Cunningham, Phillips, & Spetz, 1976).

The OAI consists of 602 work elements grouped into five categories. The categories and major subcategories are listed here:

A. Information Received

   Information Content
   Sensory Channel

B. Mental Activities

C. Work Behavior

   Physical Work Behavior
   Representational Work Behavior
   Interpersonal Work Behavior

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D. Work Goals

E. Work Context

One reason for the large number of elements in the OAI was the inclusion of many job-oriented (See p. 4) elements, activities associated with a particular occupation. This is more easily understood by noting the representation of jobs studied according to their coding in the Dictionary of Occupational Titles (U.S. Department of Labor, 1965). The number in the sample, the three-digit DOT code and the category are listed below (Boese & Cunningham, 1975):

327	000-199	Professional, Technical, and Managerial Occupations
353	200-299	Clerical and Sales Occupations
181	300-399	Service Occupations
44	400-499	Farming, Fishery, Forestry, and Related Occupations
507	500-999	Operatives, Skilled Trades, and Related Occupations
1414	-	Total

Ratings on the OAI's 602 elements for each of the 1414 jobs selected to represent these occupations were factor analyzed to develop basic dimensions. An example of the final product is shown below:

> Factor A-1: Electrical and electronic information: Information obtained from operating, diagnosing, and observing electrical devices or from relevant drawings, displays, and written materials.

Like the PAQ, the OAI has been subjected to systematic analysis to determine both its psychometric properties and the extent to which it can be used as a proper foundation for application in other settings than job description.

Standardized Formatting

Job information may be obtained by a variety of methods as has been discussed previously. Regardless, it can be summarized in standardized fashion. One way of accomplishing this is to have the analyst interpret the information according to a standard format. That is, the analyst uses specified scales and uses the job information as evidence of appropriate placement along the scale. The results of some methods of information collecting are easier to handle in this way than are others. Some form of task description is the easiest.

Functional Job Analysis (FJA). The basic concept of FJA was developed by Sidney A. Fine and his associates during research performed in preparation for the 1965 edition of the Dictionary of Occupational Titles. Much of the later work on FJA was performed at the W. E. Upjohn Institute for Employment Research, Kalamazoo, Michigan (Fine & Wiley, 1971). Scales were developed for three primary classifications: Data, People, and Things. These were considered to exist in a hierarchy from a low level of the triad to a high level. In addition, the total job could be partitioned off into these three primaries. The FJA system also includes four other scales (Fine, 1973) but they are separate characterizations. These are: worker instructions; reasoning development; mathematical development; and language development.

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Each step of the functions scales is carefully defined to maximize consistency of level assignment. For example, the lowest level of the Data Function Scale is Comparing. This is defined as "Selects, sorts, or arranges data, people, or things, judging whether their readily observable functional, structural, or compositional characteristics are similar to or different from prescribed standards." An intermediate level of the People Function Scale is Persuading, defined as "Influences others in favor of a product, service, or point of view by talks or demonstrations." The highest level on the Things Function Scale is Setting Up, defined as "Installs machines or equipment; inserts tools; alters jigs, fixtures, and attachments; and/or repairs machines or equipment to ready and/or restore them to their proper functioning according to job order or blueprint specifications. Involves primary responsibility for accuracy. May involve one or a number of machines for other workers or for worker's own operation." (Fine, 1973).

A complete listing of the steps in each of the scales is given here. Note that alternatives are provided for some of the steps.

Data Function Scale

1. Comparing
2. Copying
3A. Computing
3B. Compiling
4. Analyzing
5A. Innovating
5B. Coordinating
6. Synthesizing

People Function Scale

1A. Taking instructions-helping
1B. Serving
2. Exchanging information
3A. Coaching
3B. Persuading
3C. Diverting
4A. Consulting
4B. Instructing
4C. Treating
5. Supervising
6. Negotiating
7. Mentoring

Things Function Scale

1A. Handling
1B. Feeding-offbearing
1C. Tending
2A. Manipulating
2B. Operating-controlling
2C. Driving-controlling
3A. Precision working
3B. Setting up

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While Fine and his associates use these scales to interpret data collected by means of task statements, any compilation of job information could be used if it provided sufficient detail for making reliable and valid judgments.

Job Element Method. This method was developed by Ernest S. Primoff of the U.S. Civil Service Commission (Primoff, 1971). It was developed as a basis for the establishment of standards for the selection of candidates for employment in the federal government. Its use has been extended into state and local government agencies as well. The method uses a set of carefully defined criteria and systematic procedures for determining critical worker requirements and then examining for them. Job elements are the various knowledges, skills, abilities, and other personal characteristics (KSAO's) necessary for workers to perform the job. KSAO's are identified by persons familiar with the job, usually incumbents and their supervisors. Initially, KSAO's are proposed and listed with little critical evaluation. The evaluation comes through the application of four rating scales. The rating factors and the rating scale categories are:

Barely acceptable workers now on the job:

\+ (2) All have

v (1) Some have

o (0) Almost none have

To pick out acceptable workers the element is:

\+ (2) Very important

v (1) Valuable

o (0) Does not differentiate

Trouble likely if the element is not considered:

\+ (2) Much trouble

v (1) Some trouble

o (0) Safe to ignore

Practicality. Demanding this element we can fill:

\+ (2) All openings

v (1) Some openings

o (0) Almost no openings

A specific application of the Job Element Method is the J-coefficient whereby the important or critical job elements are translated directly into selection characteristics (Primoff, 1972). These elements are identified by constructing index scores from the rating values obtained from application of the scales just discussed. For example, an overall item index is constructed by multiplying the superior workers value by the practicality value and adding the trouble value.

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Work Elements Inventory. This inventory was developed by Melany E. Baehr and her associates at the Industrial Relations Center, The University of Chicago (Baehr, Lonergan, & Potkay, 1967). It is defined on the form used for profiling the results as "A standardized and quantitative measure for defining the basic dimensions of jobs in terms of underlying work behaviors and for assessing the relative importance of these dimensions for overall successful performance." A job description instrument, the WEI, with factorially determined job dimensions, is scored and the results are profiled for the job on a standard score scale according to degree of importance to the job. The overall dimensions and their subscales are:

Organization

- Setting Objectives
- Improving Procedures
- Promoting Safety
- Developing Technical Ideas

Leadership

- Decision-Making
- Developing Teamwork
- Coping with Emergencies

Personnel

- Developing Employee Potential
- Supervisory Practices
- Self-Development

Community

- Community-Organization Relations
- Handling Outside Contacts

Baehr and her associates have used the same technique to construct other inventories, see Skill and Attributes Inventory (Baehr, 1971).

Physical Abilities Analysis (PAA). A special subset of abilities and job demands is physical proficiency. Edwin A. Fleishman has devoted many years to this area (Fleishman, 1964, 1975, 1979). His research and that of his associates has isolated nine abilities that form the basis for evaluating physical requirements of tasks. The importance of this research is growing daily with increased attention to employment of women in nontraditional physically demanding jobs, employment of the handicapped, and job protection for older workers. The nine abilities are listed here with a brief description of each as used by Fleishman:

- Dynamic strength. This is defined as the ability to exert muscular force repeatedly or continuously over time.

- Trunk strength. This is a derivative of the dynamic strength factor and is characterized by resistance of trunk muscles to fatigue over repeated use.

- Static strength. This is the force that an individual exerts in lifting, pushing, pulling, or carrying external objects.

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- Explosive strength. This is characterized by the ability to expend a maximum of energy in one or a series of maximum thrusts.

- Extent flexibility. This involves the ability to extend the trunk, arms, and/or legs through a range of motion in either the frontal, sagittal, or transverse planes.

- Dynamic flexibility. This contrasts with extent flexibility in that the ability involves the capacity to make rapid, repeated flexing movements, in which the resilience of the muscles in recovering from distention is critical.

- Gross body coordination. This is the ability to coordinate the simultaneous actions of different parts of the body or body limbs while the body is in movement. This ability is frequently referenced as agility.

- Gross body equilibrium. This is the ability to maintain balance in either an unstable position or when opposing forces are pulling.

- Stamina. This is synonymous with cardiovascular endurance and enables the performance of prolonged bouts of aerobic work without experiencing fatigue or exhaustion.

In analyzing a job by PAA the analyst uses a seven-point scale which is anchored at the top with a maximum performance task and at the bottom with a minimum performance task. Other tasks well-known to the raters are used to describe other levels on the scale. The physical tasks of the job are compared with these scaled examples and are slotted in appropriately.

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D. A VALID PROCEDURE FOR TESTING THE PHYSICAL ABILITIES OF JOB APPLICANTS

Mark A. Jones and Erich P. Prien

Dr. Mark A. Jones is an industrial-organizational psychologist and a full time consultant with Performance Research and Measurement Assoc.

Dr. Erich P. Prien is an industrial-organizational psychologist with Performance Management Assoc. in Memphis, TN and a professor at Memphis State University

(Unpublished Report)

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Until the enforcement of federal guidelines on employee selection became a concern for employers, it was common practice in industry to assign "heavy" or physically demanding work to men and lighter jobs to women. In many cases this practice was even sanctioned by state laws which specifically limited the loads that women could handle. The net effect was to produce barriers that excluded women in general from often higher paying jobs because they were considered "too small" or "not strong enough" to perform the work. Nowadays it is obviously unacceptable to look at an applicant and simply assume he or she cannot perform a given job because of small stature, sex, or general physical appearance. But those organizations that *do* have physically demanding jobs face a practical dilemma: how can they select people accurately and legally who are able to perform demanding physical work?

In the case of a single job such as police officer, one common strategy has been to replicate key physical tasks from the job (e.g., scaling a wall, running after a "suspect", jumping over gulleys) and require applicants to pass these "job sample tests". Such tests are relatively easy to validate using either a content or criterion-referenced validation design. An alternative strategy is simply to place applicants in a job regardless of their physical characteristics and see how they perform. Those who succeed, stay; those who fail, leave — unless of course they are injured first, in which case they don't leave, they collect workers' compensation payments.

The research described in this article was sponsored by an organization that tried this latter approach. But after numerous costly job failures and several serious injuries, the decision was made to study the possibility of identifying those who could perform the work without high risk of personal injury *before* they were hired. Unfortunately a number of considerations made this objective difficult to attain. First, because the company had not one, but several dozen physically demanding jobs, the job sample approach was not really feasible in this setting. In addition to the prohibitive cost of test development and administration, examining each applicant for one job at a time was not considered practical because new em-

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ployees typically will occupy several entry-level positions during their first few weeks on the job. In addition, the sponsoring organization had a firm commitment to the principles of equal employment opportunity and was, therefore, concerned about meeting its voluntary affirmative action goals for the increased utilization of females in the workforce. Thus major consideration had to be given to the potential impact of physical ability screening procedures on women in particular.

Taking all factors into consideration, it was apparent that any approach to solving this organization's problems with selecting and placing people in physically demanding jobs would need to:

1. Identify applicants who had a high probability of succeeding in their jobs and a low probability of incurring injuries due to insufficient strength or physical ability;
2. Be useful for selecting employees for a number of jobs that have varying degrees of physical demand (rather than for one job);
3. Be economical to develop and use; and
4. Lead to decisions about people based on predicted job performance, not on race, sex, religion, or national origin.

General approach

In order to develop a procedure which satisfies all of these requirements, the research plan called for some atypical strategies. First, the jobs were analyzed in terms of the underly-

Exhibit I

Physical Ability Dimensions

Dynamic Flexibility: This is the ability to make repeated trunk and/or limb flexing movements where both speed and flexibility of movements are required. It includes the ability of these muscles to recover from the strain and distortion of repeated flexing. It does not involve prolonged activity or fatigue as does "Stamina". Crawling on the floor, scraping paint, or engaging in a 10-round prize fight would involve this dimension.

Explosive Strength: This is the ability to expend energy in one or a series of explosive muscular acts. The ability requires a mobilization of energy for a burst of muscular effort, rather than continuous strain, stress, or repeated exertion of muscles. The ability may be involved in propelling the body as in jumping or sprinting or in throwing objects for distance. Jumping over a ditch or throwing a shotput involve this dimension.

Static Strength: This ability involves the degree of muscular force exerted against a fairly immovable or heavy external object in order to lift, push, or pull that object. Force is exerted continuously up to the amount needed to move the object. This ability is general to different muscle groups (e.g., hand, arm, back, shoulder, leg). This ability does not extend to prolonged exertion of physical force over time and is not concerned with the number of times the act is repeated. Pushing a wheelbarrow or pulling a wagon would involve this dimension.

Dynamic Strength: This ability involves the power of arm and leg muscles to repeatedly or continuously support or move the body's own weight. Emphasis is on resistance of the muscles to performance decrement when put under repeated or continuous stress. Climbing a ladder, scaling a wall, or performing the "iron cross" in gymnastics would involve this dimension.

Trunk Strength: This is a dynamic strength factor specific to trunk muscles, particularly the abdominal muscles. Tests which measure this dimension require that the subject demonstrate his ability to endure repeated or continuous exertion of these muscles. Stooping at the waist would involve this dimension.

Gross Body Equilibrium: This is the ability to maintain the body in an upright position or to regain body balance especially in situations where equilibrium is threatened or temporarily lost. This ability involves only body balance; it does not extend to the balancing of objects. Walking on wet surfaces or skiing would involve this dimension.

Stamina: This ability involves the capacity to maintain physical activity over prolonged periods of time. It is concerned with resistance of the cardiovascular system (heart and blood vessels) to breakdown. Climbing the stairs of the Washington Monument or swimming the English Channel would require a great deal of this ability.

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ing physical abilities required to perform the work. Second, standardized tests were chosen for measuring how much of each different ability the individual applicants possessed. Third, and finally, when the physical testing program was implemented, a follow-up study was planned to confirm the accuracy and utility of the new procedures. Each of these steps is detailed below.

Identifying underlying physical abilities. A key objective of the research was to develop a procedure that could be used as a single screening device for several dozen different jobs; thus it was imperative to identify the physical ability requirements that were important to some degree in all entry-level jobs in the organization. So, unlike typical job analysis approaches that might derive an infinite number of job requirements directly from the job tasks, this study started by using an existing structure for describing jobs in terms of their common, underlying physical ability requirements. This approach was made possible by the extensive work of Fleishman and his associates on basic human abilities (Theologus, G., Romashko, T. and Fleishman, E. "A feasibility study of ability dimensions for classifying human tasks", Technical Report No. 5, Washington. D.C.: American Institutes for Research, 1970). Through years of empirical study these researchers identified a finite set of cognitive, perceptual and physical ability dimensions (and some corresponding prototype measures) that could be used to describe any job. Based on a preliminary review of the entry-level positions in the company, seven of the physical ability dimensions were chosen to form the structure for analyzing jobs in this study. Each is named and described in Exhibit 1.

An example job description using this structure appears as Exhibit II. Note that the job is described in terms of observable tasks representing each physical ability dimension. Only the most demanding, regularly occurring task was recorded for each dimension.

Because of the complexity of some job tasks, single tasks involving more than one physical ability at a time were often classified in more than one dimension or category. For example, pushing a wheelbarrow full of concrete for the Materials Handler in Exhibit II represented both the most difficult static strength activity and the most demanding stamina requirement.

After all jobs in the study had been described in this fashion, they were evaluated by a team of job analysts to determine what level of each physical ability was required to perform each task. The analysts used graphic scales with specific behavioral anchor points to determine these requirement levels for each job. (See sample scale in Exhibit III.) Although based on Fleishman's (1970) prototypes, the seven scales used here were developed uniquely for this study. (See the Appendix for more details on scale development.)

Upon completion of all entry-level job descriptions, the analysts together evaluated each ability requirement for each job using the seven scales. Mean inter-judge agreement across all jobs and dimensions was high ($r = .82$) and the individual judgements were combined to produce a numerical average for all seven physical ability dimensions for each job. For instance, considering the sample materials included in Exhibits II and III, the ability requirement level or score for the Materials Handler was established by the job analysts as 3.3 on the Gross Body Equilibrium dimension.

Exhibit II

Sample Job Description

JOB TITLE: Materials Handler

INFORMATION SOURCE: G. Persons

ANALYST: G. Smith

DEPT: Labor

DIVISION: West

DATE: 5/21/77

JOB SUMMARY: The Materials Handler *moves* and *stacks* pallets, lumber and bagged materials manually; *breaks* concrete and ice using jack hammer or sledge hammer; *pours* concrete while assisting construction crews; *unloads* liquid tank cars; *picks up* trash and performs other general housekeeping duties.

JOB TASKS:

Dynamic Flexibility:	slings 10 lb. sledge to break concrete or ice for one to two hour intervals
Explosive Strength:	lifts 74 lb. gas bottles from floor onto 48 in. rack
Static Strength:	pushes 350 lb. wheelbarrow of concrete up soft, three foot incline
Dynamic Strength:	climbs up and down rail cars throughout shift
Trunk Strength:	lifts 74 lb. gas bottles from floor onto 48 in. rack several times daily
Gross Body Equilibrium:	climbs and walks on ice covered rail cars
Stamina:	pushes 350 lb. wheelbarrow of concrete up soft, three foot incline several times daily.

Verified By: J. Adams Date: 7/15/77

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Physical ability tests. The tests in the experimental battery were designed to be the purest, most reliable and most accurate measures of individual ability for each physical ability dimension or category. They were chosen from a catalog of tests developed again by Fleishman (see *The Structure and Measurement of Physical Fitness*: Prentice-Hall, 1964). A brief description of each test in the battery appears in Exhibit IV.

In order to evaluate these tests appropriately, they were administered to a sample of 212 applicants, 114 males and 98 females. Reliability estimates were obtained (all exceeded $r = .75$ except for the Stamina and Gross Body Equilibrium tests) and means and standard deviations were calculated. As expected, there was only minimal overlap between male and female performance on the strength tests, with males scoring uniformly higher on measures of dynamic, explosive, static and trunk strength.

Exhibit III

Sample Physical Ability Dimension Evaluation Scale

GROSS BODY EQUILIBRIUM

This is the ability to maintain the body in an upright position or to regain body balance especially in situations where equilibrium is threatened or temporarily lost. This ability involves only body balance; it does not extend to the balancing of objects.

-1

Walk on park benches

-2 Climb 24 foot ladder
Walk on catwalk with rail

Walk on wet floor or wet catwalk

-3 Walk in crouching or squatting position while working under equipment

-4

Walk on 3" rim of rail car stopping every several feet

Walk on a shipdeck in stormy seas

-5

-6 Ski the giant slalom

-7

Implementation

Once the job analysis phase of this study had been completed and the different requirement scores established for each entry-level job, the scores were summed by dimension and an average requirement level or score was calculated for each of the seven physical ability dimensions. In the case of Gross Body Equilibrium, for instance, the average ability requirement score for all jobs in the study was found to be 2.0. Referring again to Exhibit III, this score means that applicants for entry-level jobs in this company should have as much body balance, on the average, as it takes to climb a ladder.

Based on these average requirement scores, it was apparent that significant levels of Gross Body Equilibrium, Dynamic Strength and Stamina were not required of a new employee to perform most entry-level work. That is, the requirement levels were so low that tests measuring these abilities probably would *not* predict performance in the majority of entry positions. Thus the test battery was modified before final implementation to include only measures of dynamic flexibility and explosive, static and trunk strength. Based on test data obtained from the sample of 212 individuals' raw scores on the different tests could be converted into standard scores and then summed. This procedure produced a single total (i.e., composite) physical ability score for each applicant which, in turn, could be used for screening and placement decisions. In operation, a cutting score was set at a point which allowed the company to meet its affirmative action goals for females. This minimum score was applied uniformly to all applicants, both male and female.

Follow-up demonstration study

During the time this research was being conducted, another validation study was in progress that provided an opportunity to confirm the accuracy and utility of the physical testing program. Briefly, a small sample (51 males and 10 females) was administered the physical ability test battery and then placed in entry-level jobs. The test results were not used in the hiring decision, nor were they ever seen

'Those organizations that have physically demanding jobs face a practical dilemma: how can they select people accurately and legally who are able to perform demanding physical work?'

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Exhibit V

Expectancy Charts Using the Composite Physical Test Score

Test Score Range	Changes in 100 of Attaining Job Success*				
	0	25	50	75	100
423-486				67%	
394-422			48%		
200-393		27%			

*Rating ≥ 7 of 10 on OVERALL JOB PERFORMANCE

Test Score Range	Chances in 100 of Attaining Job Success**				
	0	25	50	75	100
422-486					90%
396-421				71%	
200-395		31%			

**Rating ≥ 8 of 12 on PHYSICAL PROFICIENCY

by the subjects' supervisors.

After 60 days in one or more entry-level positions, the performance of each subject was evaluated by his or her respective supervisor. These ratings measured several performance domains including "job knowledge", "learning ability", "physical proficiency" and "overall job performance". The criterion measures themselves were developed through conventional critical incident procedures and were presented to raters in behavioral expectancy formats. The "physical proficiency" rating content was embedded in a mixed standard scale and included items such as: "Could be expected to lift and move heavy items in one smooth motion," or "Could be expected to not need help in picking up a heavy load." "Overall job performance" was measured using a standard graphic scale approach.

The correlations between the composite physical test scores and the ratings on both physical proficiency and overall performance for the sample of 61 were statistically significant at the $p \leq .01$ level (for physical proficiency, $r = .40$; for overall performance, $r = .38$). Because it was possible that male-female differences on both the test and the criteria could have inflated the correlations ar-

'A key objective of the research was to develop a procedure that could be used as a single screening device for several dozen different jobs; thus it was imperative to identify the physical ability requirements that were important to some degree in all entry-level jobs in the organization.'

Exhibit IV

Tests for Assessing Each Physical Ability

Dynamic Flexibility: The subject stands with his back to a wall and repeats a twisting and flexing cycle: touch floor, turn right and touch wall behind shoulder, touch floor, turn left and touch wall . . . ; score is the time to complete 20 cycles.

Explosive Strength: The subject stands erect and throws a 50 lb. canvas bag, first underhanded, then overhanded. The object of the test is to throw the bag as far as possible.

Static Strength: Two tests of static strength were used in the experimental battery, each focusing on a different muscle group. The first, measuring hand and arm strength, was a commercial hand dynomometer. Arm and shoulder strength was measured with an arm dynomometer constructed by the company's maintenance shop.

Dynamic Strength: The subject pulls himself up on a cross-bar with his arms to a point where his eyebrows are level with the bar. The score on the "bent-arm hang" is elapsed time the subject can hold that position.

Trunk Strength: In this test, the "half-hold situp", the subject lies on his back and then raises his upper body to an approximately 40 degree angle from the floor while keeping his legs down flat. The object is to hold the position as long as possible.

Gross Body Equilibrium: In two tests the subject balances with one foot on a rail, in stocking feet with his hands on his hips. His foot is first parallel and then across the long axis of the rails. The second pair of equilibrium tests require the subject to do the same as above, except using two feet. Score is the total length of time subject maintains his balance.

Stamina: This is called the "step test" in which the subject steps up to and down from a flat surface that is 20 inches from the floor. Subject must repeat this up and down cycle ten times. Stamina or cardiovascular resistance is measured in terms of heart rate change before and after the test. The greater the increase in heart rate, the lower the person's stamina.

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tificially, a second analysis was carried out for the male sample only. Again, the relationships between the composite physical test score and measures of both overall performance and physical proficiency were significant (for physical proficiency, $r = .30$; for overall performance, $r = .38$). These findings would suggest that a true relationship does exist between individual physical ability (as measured with the tests) and job performance, regardless of the applicant's sex.

Based on this small demonstration study, it was possible to forecast the utility of the testing program for the sponsoring organization. Inspection of Exhibit V indicates that the physical test battery can be used to predict with some accuracy which applicants have a higher probability of success in entry-level work and which will probably fail. Research to confirm the correspondence between physical ability and the incidence of physical injury on the job is still in progress. □

Appendix

Job analysis evaluation scales

A key element of this study was the methodology for analyzing the target jobs in terms of the physical abilities required of incumbents to perform those jobs successfully. This methodology was based on the previously cited work by Fleishman and his associates who produced a set of over 50 human ability dimensions that could be used to describe any job. The list includes cognitive dimensions (e.g., inductive reasoning, number facility, fluency of ideas, oral expression), perceptual dimensions (e.g., spatial orientation, selective attention, speed of closure, flexibility of closure) and physical dimensions (e.g., static strength, reaction time, wrist-finger speed, manual dexterity).

Only the list of physical dimensions were of interest to this study, of course. That list was further reduced to just seven dimensions by conducting a preliminary review of the entry-level jobs and retaining only those physical ability categories that, in the judgment of the analysts, would differentiate between more and less successful employees. This "preliminary review" included walking through the plants, observing employees perform some of the most demanding entry-level jobs and discussing the types of performance and injury problems experienced by first-line supervisors.

Once the list of seven physical ability dimensions had been chosen, the job analysis studied each job in depth using both observation and interview techniques. These analyses produced a job description for each job in the format that appears in Exhibit II.

The next step — judging "how much" of each physical ability was needed to perform each job — required the use of some unique measuring scales. These instruments were developed by enriching Fleishman's original prototype scales with additional content directly from the job setting. First, using their extensive knowledge acquired during the job analysis process, the analysts produced a list of critical job tasks, each task requiring predominantly one of the seven abilities. In a procedure analogous to the retranslation method[2], the analysts then independently sorted each of the tasks back into its respective category or dimension; finally, they assigned a value from one to seven to each task indicating the degree to which the respective physical ability was needed to perform the task. If the analysts did not agree either on which dimension a task predominantly represented or on its scale value, that task was not retained. Those task statements that were retained were added to Fleishman's prototypes as supplemental references or anchor points on each scale. In the example appearing in Exhibit III, Fleishman's original anchors included "walk on park benches", "walk on a shipdeck in stormy seas" and "ski the giant slalom". The other more specific job tasks were added using the process just described.

The most difficult problem likely to be encountered when developing measuring scales for independent ability dimensions like those used in this study will be finding job tasks that are relatively pure examples of anyone dimension. In practice, most job tasks are complex and involve more than one ability dimension at a time. Each specific task used to enrich Fleishman's general prototypes, therefore, will rarely be a pure example of an ability; however, it should involve predominantly *one* type of ability and it must be conceptually consistent with the other task anchors on the scale. □

1 Flanagan, J. C. "The critical incident technique." *Psychological Bulletin*, 1954, 51, 327-358.

2 Smith, P. C. & Kendall, L. M. "Retranslation of expectations: An approach to the construction of unambiguous anchors for rating scales." *Journal of Applied Psychology*, 1963, 47, 149-155.

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